

April 28, 1947

STEEL

The Magazine of Metalworking and Metalproducing

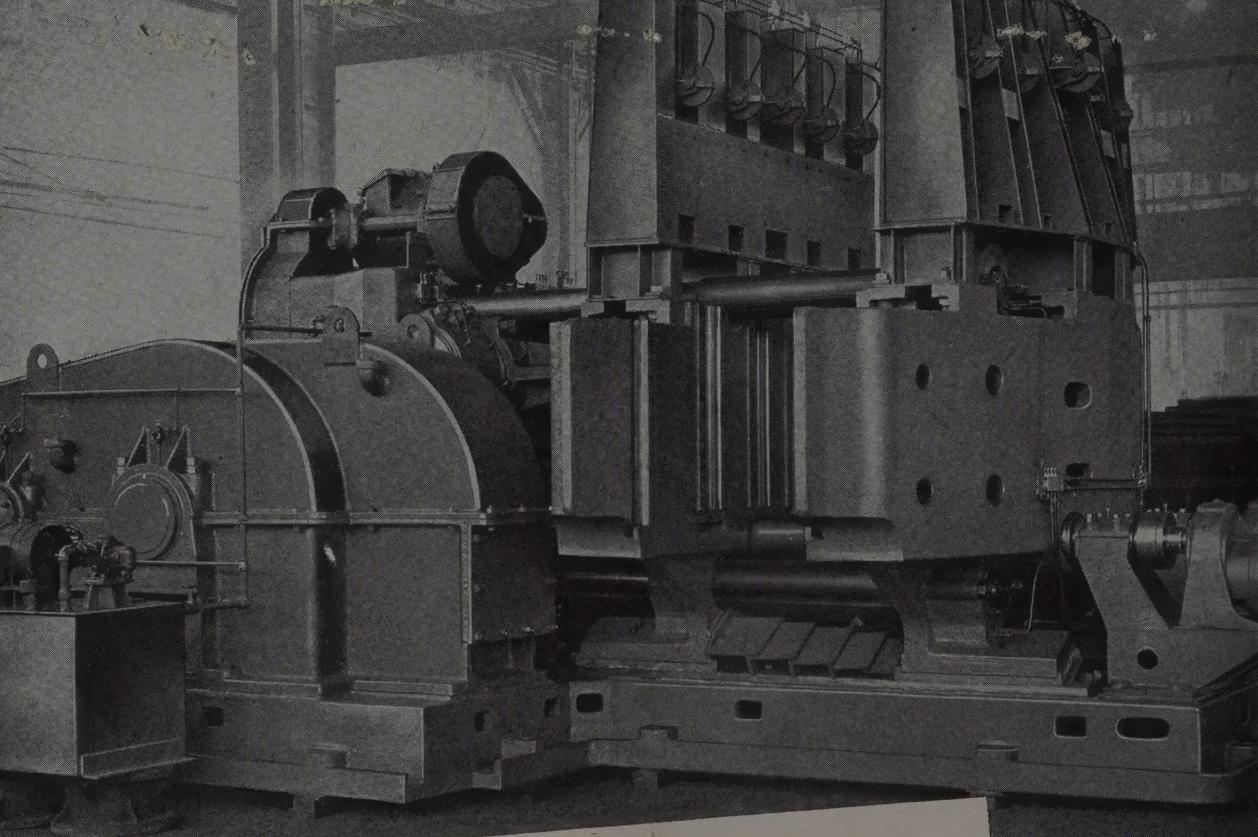
ESTABLISHED 1882

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ed and desired

Morth Steel Company
Claymont
Delaware



**MORGAN GAG PRESS FOR STRAIGHTENING
HEAVY ROLLED SECTIONS**

● Among the many types of mill equipment built by Morgan, is the heavy duty gag press or straightener illustrated above. It is of massive construction with drive gears and flywheel mounted on roller bearings and all enclosed in an oil-tight welded housing. All anvil blocks are raised and lowered by individual air cylinders. The two feed rollers are driven by individual motors. This press is typical of the many types of Morgan mill equipment.

BUILT BY MORGAN
Engineering

**THE MORGAN ENGINEERING CO.
ALLIANCE, OHIO.** 1420 Oliver Building, Pittsburgh

DESIGNERS • MANUFACTURERS • CONTRACTORS • BLOOMING MILLS • PLATE MILLS
STRUCTURAL MILLS • ELECTRIC TRAVELING CRANES • CHARGING MACHINES • INGOT STRIPPING
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HAMMERS • STEAM HYDRAULIC FORGING PRESSES • SPECIAL MACHINERY FOR STEEL MILLS

NEW MILL DEPOT FOR TOOL STEEL *NOW IN OPERATION*



Located at the Bethlehem, Pa., plant, the new depot features large stocks of the standard tool steels in popular sizes.

GOOD NEWS FOR MILL CUSTOMERS

Bethlehem's new tool steel mill depot is now in operation, providing greatly improved service. Distributors and mill customers can rely on immediate shipments from large stock stocks of standard tool and die steels in popular sizes and shapes. Modern in every respect, the new facilities represent another step forward in Bethlehem's program to maintain a *complete* tool steel service.

For every job in your shop requiring tool or die steel, there is a Bethlehem grade that will give a good account itself. Call us when tool steel problems get tough—or better still, let us work with you from the start.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

Immediate Shipments

TOOL AND DIE STEELS

Carbon and Carbon-Vanadium Tool Steels

Oil-Hardening Die Steel (BTR)
High-Carbon, High-Chrome Die Steel (Lehigh H)

SHOCK-RESISTING AND GENERAL-PURPOSE TOOL STEELS

Omega and 67 Chisel

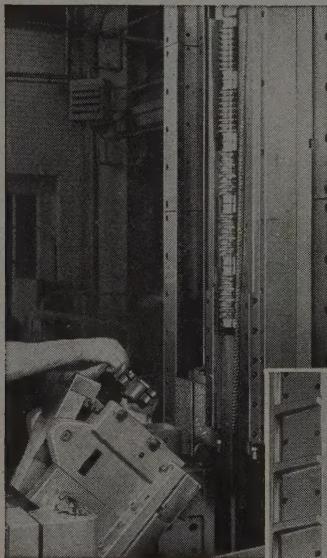
HIGH-SPEED STEELS

Bethlehem Special High Speed (BSHS)
66 High Speed

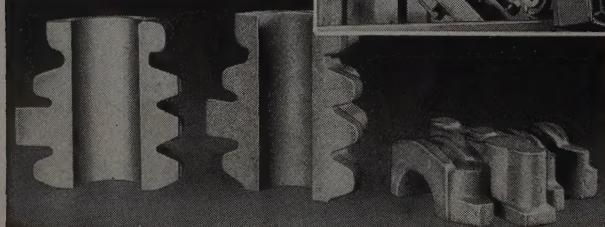


BETHLEHEM TOOL STEELS for EVERY JOB

BEARING CAP SETS BROACHED EN BLOC



Operation at right straddle broaches the two ends of the casting.



Above: Right to left: 1. The rough casting.
2. Ends straddle broached. 3. Joint face, bearing lock and half round broached.

FOR ALL YOUR BROACHING NEEDS—

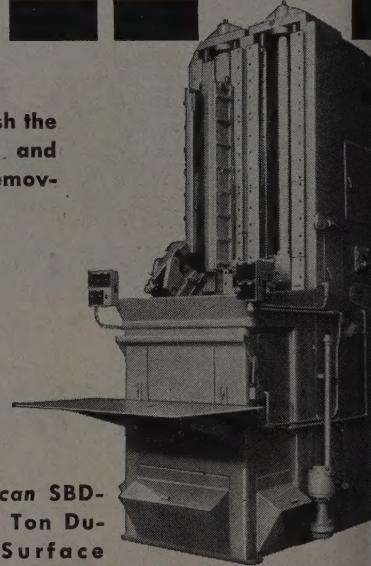
SEE AMERICAN FIRST

This American Duplex Surface Broaching Machine is tooled up to broach automotive main bearing caps, producing complete sets for 100 motors per hour.

When you are planning metal shaping or finishing work, make use of American's complete broaching service—machines, tools, and engineering. You are under no obligation when you SEE American FIRST!

Operation at the left is to finish the joint face and bearing lock and semi-finish the half round, removing $\frac{1}{8}$ stock on each surface.

American SBD-
66-25 Ton Du-
plex Surface
Broaching Ma-
chine with tilting
type work tables.



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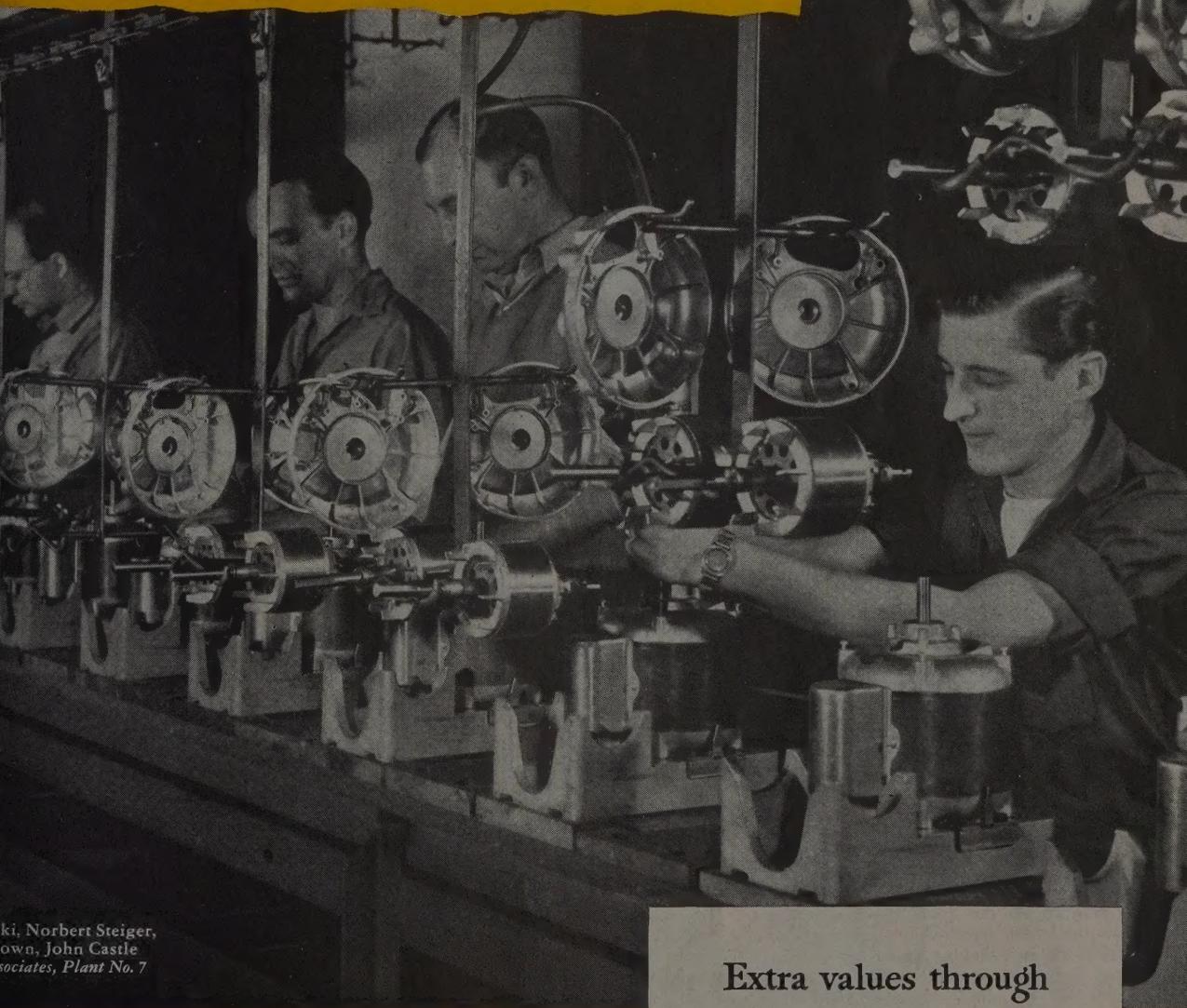
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MACHINE CO.**

ANN ARBOR, MICHIGAN

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BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF
SUNSTRAND MACHINE TOOL CO.
MACATO, ILLINOIS U.S.A.

Horsepower takes off pounds



ki, Norbert Steiger,
own, John Castle
sociates, Plant No. 7

The upper parts on the conveyor are

motor end bells. The common way to make them is of cast iron. But the common way is not good enough for Jack & Heintz.

By making these end bells of die-cast aluminum, Jack & Heintz

engineers have reduced motor weight 12%. This makes Jack & Heintz Fractional Horsepower Motors easier to handle and helps manufacturers to streamline their motor driven appliances. Use of aluminum also gives a smoother finish—improves appearance.

This is typical of the engineering achievements of Jack & Heintz mass precision methods. Look for similar extra values in Jack & Heintz refrigeration compressors, bearings and magnetos today and in other revolutionary

Jack & Heintz products tomorrow.

Extra values through

JACK & HEINTZ

Mass Precision

JACK & HEINTZ PRECISION INDUSTRIES, INC., Cleveland 1, Ohio

Behind the Scenes...

On The Nose

Our various editors who cover the steelmaking centers of America and who estimate every week the rate of operations do a very sharp job. Aside from knowing exactly which furnaces are running and which are down, they have to forecast which ones will produce how much steel for the week ahead. They know their business, all right—because their guesses as to the future usually come pretty close to the record as it is compiled. For example, official figures for the first quarter are now in, showing that during those three months the nation's steel plants operated at a rate of 93.0 per cent of capacity. The weekly estimates of STEEL's editors over the same period show a figure of 93.0 per cent of capacity. Than which, as the saying goes, there is no than whicker.

Hello to the New

For what we believe is the first time since the war a new steel company has started operations. It's the Washington Steel Corp., Washington, Pa., devoted to production of flat-rolled stainless steel. Welcome to the circle, gentlemen. Good luck and success to your efforts!

Show's A-Comin'

We've been hearing a lot of rumors about the Machine Tool Show, that lallapalooza of all machine tool shows, which will be held in Chicago this fall. It's still nearly five months away, but already the drums are starting to beat and the horns to blow. We're in there pitching, trying to do our part to make it one of the most worthwhile industrial exhibitions ever held. About all we can say right now is that you'll be hearing more—a lot more—about it from now on. Guy Hubbard, our Machine Tool Editor, has been wearing a secret little smile for some months now, as he busily goes about from one end of the country to the other on mysterious missions, conferring with the leaders of the machine tool industry and making a lot of notes while saying little. "Things," he says, "are fine. Just wait and see!" So we're waiting and watching.

It Looks Good & Is Good

Speaking of Guy Hubbard, our M. T. E., reminds us that he wrote a foreword for somebody else's book last year and the book won a prize. By that we don't mean that Guy has the lucky touch or something, but if it hadn't been for Guy's foreword, we probably

wouldn't have had a chance to remark in print here on a very wonderful job of technical book makeup and design. Each year the American Institute of Graphic Arts selects the 50 books published during the year which in their opinion combine the best in layout, typography and treatment of the subject. One of the 50 during 1946 was "Precision Hole Location," by J. Robert Moore, Moore Special Tool Co., Bridgeport, Conn. It is the first book ever published on this vital phase of tool-making, and we believe it is of more than passing interest because it proves that a technical book, to be useful and valuable doesn't necessarily have to appear stuffy and unattractive. We have long believed around this print shop that the same fact applies to a business paper, which is why STEEL's art staff, headed by Art Editor Don Cadot, spends considerable time making special layouts and good, solid-looking heads for the articles our editors prepare. We think it makes sense to make material not only valuable in content but attractive in appearance, and from the results of our studies of how you folks read the book, we're inclined to think you agree!

Puzzle Corner

Correct answers to the railroad straightening problem have come from H. C. Osborne, Racine, Wis., C. S. Dexter, Madison, Wis., and the grape problem has been answered by several readers within the first day's mail—301 grapes. NOT 721, the pit into which some of you fell, including such old reliable puzzlers as Jasper Willsea. For shame! The Grape has been Your downfall! Since that one proved so easy, here's a little tougher nut for the next session. A tank, which was supposed to be cylindrical, was built by an inexperienced worker so that the top had a diameter of 30 inches, while the bottom had a diameter of 50 inches. After it was installed, it was found to hold 355 gallons. For some obscure reason, the owner decided he wanted an indicator installed which would show when the tank was half full. How high would the indicator have to be placed above the bottom of the tank, assuming it was mounted exactly on the line reached by the water when the tank was half full? For this small piece of mental exercise we thank Bert Harvey of Rockford Screw Products.

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April 28, 1947

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Editorial Staff on Contents Page

Shradha



THE NEW 75-TON MULTIPRESS

Now you can have 75-Ton
Vibratory* pressures for metals,
ceramics, plastics, chemicals
and powdered metals

IN ONE PRESS — manual or automatic "work-fit" control of every essential press-cycle

NEVER BEFORE has a press of this size featured such a wide range of ram actions and controls. Offering a choice of three valve combinations, it will meet practically every pressing-cycle need within a 75-ton range.

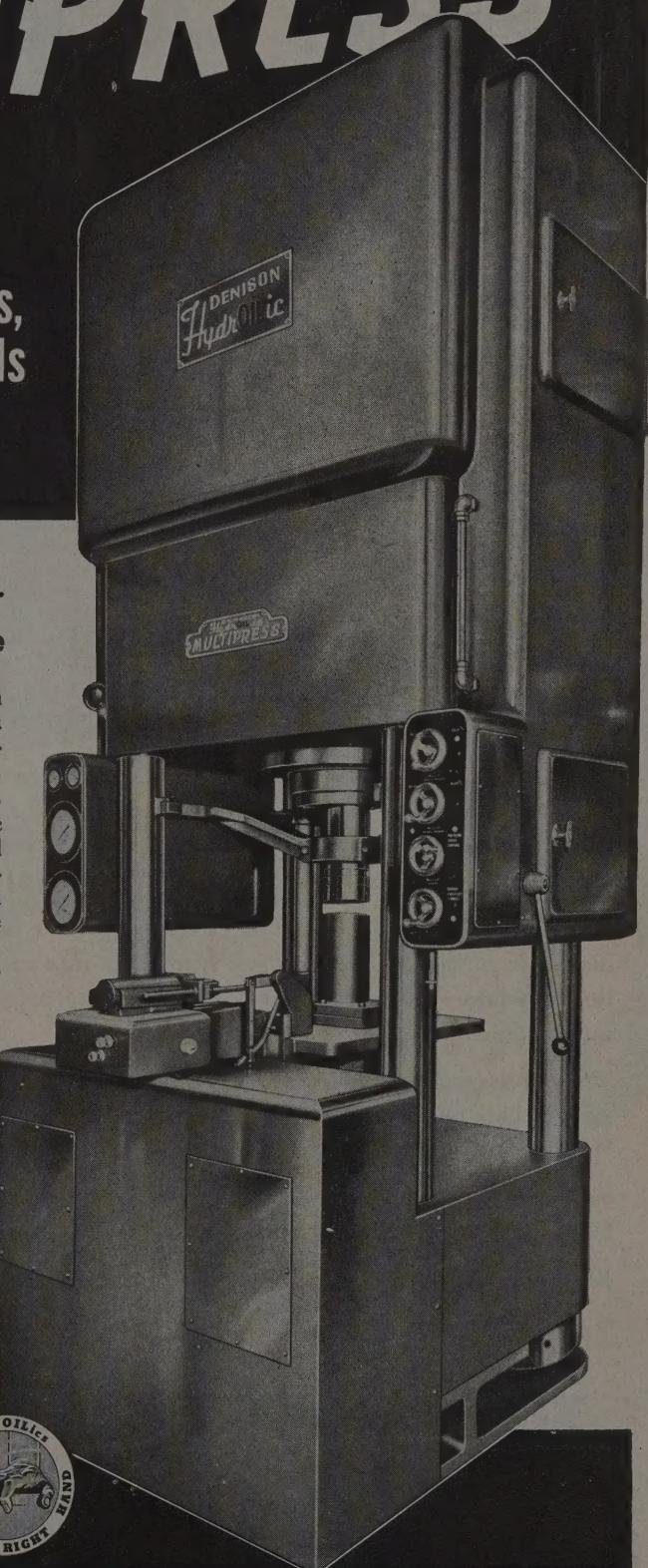
This new heavy-duty MULTIPRESS provides automatic or manual ram cycling . . . vibratory HydrOILic ram action* . . . fast traverse with slow pressing speed . . . either pressure or distance reversal . . . convenient one-man operation, with all gauges, controls and adjustments at finger tips . . . large, easy accessible tooling area . . . a wide variety of accessory toolings. The press is of compact, self-enclosed, unit construction, featuring a water-cooled hydraulic system and a pressurized filter system. The press has a 30-inch daylight opening and a maximum 18" stroke.

If you use or need press equipment for any type of operation in the 75-ton range, you'll want full details on the many advantages of this highly versatile new MULTIPRESS. Write for bulletin DS-7.

*An exclusive MULTIPRESS development, providing short, uniform, repeat pressure strokes on the work with each downstroke of the ram.

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SHINYHEADS for hexagon head cap screws of high carbon C-1038 steel, full-finished, bright, shiny heads.

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This is all there is to the "Feather-Touch" Clutch Control—simple, positive, dependable.



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The clutch action is in direct ratio to the movement of the operating lever, the feel of the load is always present, release is positive and there can be no shutdown because of control failure.

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**Here's typical CSM performance—metal removal Rate
on Heppenstahl Steel (375 Bhn) 6.3 cu. in. per min.**

WORKPIECE: Die Block

MATERIAL: Heppenstahl Die Steel

HARDNESS: 375 Bhn

OPERATION: Squaring block*

DEPTH OF CUT: 3/16"

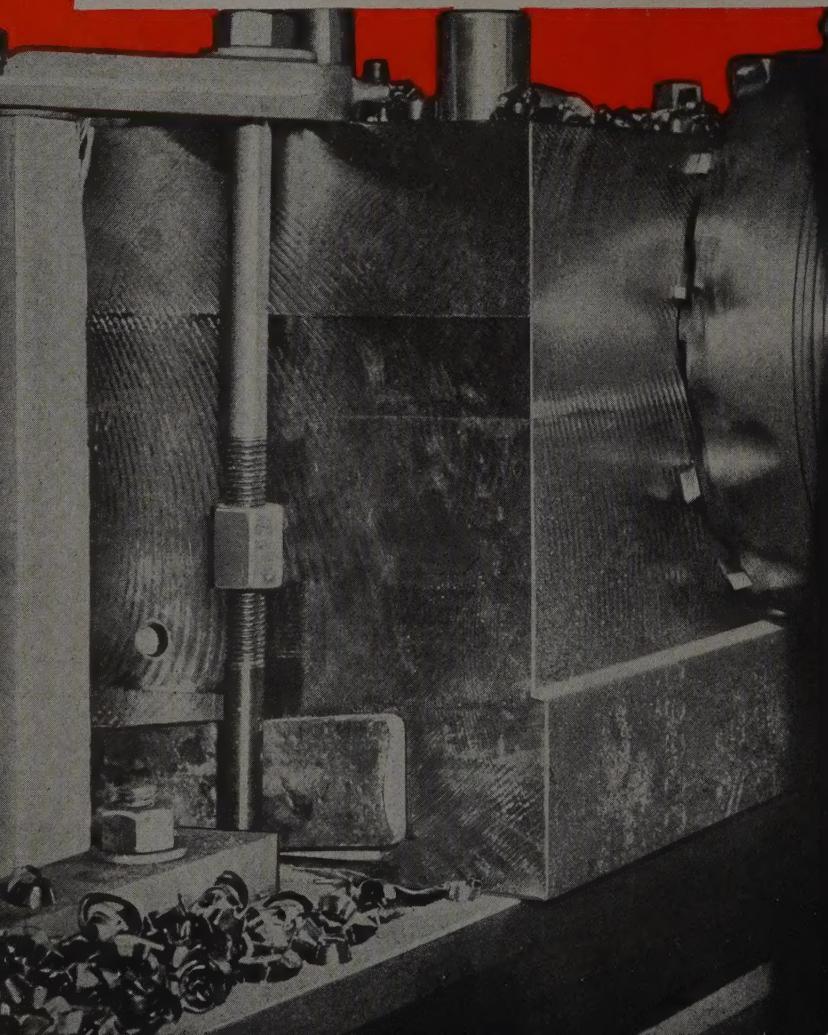
CUTTER: Kearney & Trecker CSM 10" diam.
carbide face mill.

SPEED: 76 RPM (200 SFM)

FEED: 4.5 IPM (.005" per tooth)

RATE OF METAL REMOVAL: 6.3 cubic inches per minute

*2 passes per side. Cutter sharpened once per 2 sides.



high rates of metal removal Trecker CSM Milling Machines

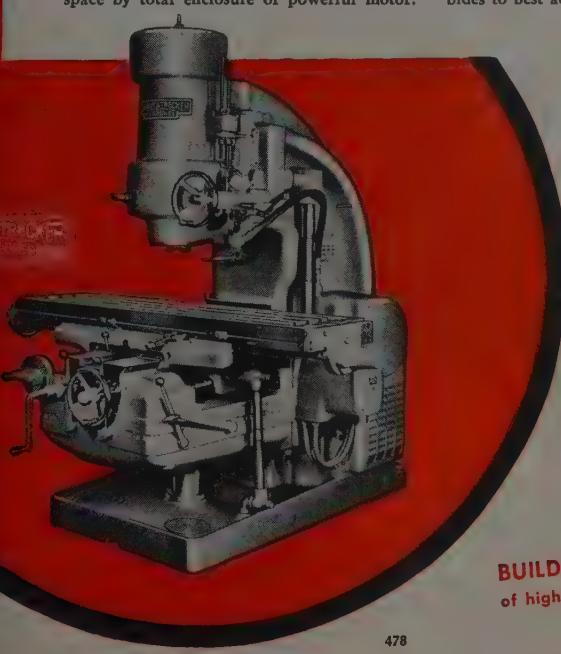
*Use carbide cutters to maximum efficiency—
high horsepower, extra-husky construction
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make record metal removal rates possible*



Look at that column! Pyramid shape, wide base, solid back, box-type ribbing give you maximum rigidity and vibration-free operation. That means high metal removal rates, accuracy, long tool life. Design saves floor space by total enclosure of powerful motor.

Speeds and feeds selected by quick-change dials. Choice of 16 spindle speeds mean right cutter speed for use on almost any material. 32 feeds to table and knee mean right feed per cutter tooth, a key factor in using carbides to best advantage.

CSM's incorporate original vibration-free three-bearing spindle design. Flywheel, now an integral part of spindle, insures constantly smooth flow of power to cutter. Electrical controls for acceleration and deceleration of gear train are part of basic design.



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Because CSM's are different from any other milling machines — only a check of your production by an experienced Kearney & Trecker engineer, trained in the use of CSM's, can show you the tremendous savings possible. CSM's are made in Plain and Vertical types with 20, 30, and 50 hp. For an on-the-spot personal analysis of how CSM's can increase your production, *wire us collect*. There is no obligation.

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Since their new Warner & Swasey Automatic went into action, Johnson Products Inc., Muskegon, Michigan, can easily handle rush jobs and small lots—can schedule them along with medium and long runs. Warner & Swasey's exclusive Quick-Set mechanism for fast changeover makes short runs practical—so practical that on one occasion *three job set-ups in two days* were made in this shop.

Manufacturers of valve tappets exclusively, and important suppliers to the automotive

industry, Johnson Products now make their steel tappets with tough 52100 heads *faster, better, at less cost* on Warner & Swasey Multiple Spindle Automatic Bar Machines.

On the basis of their first machine's performance, Johnson Products are diverting more of their production to Warner & Swasey Automatics. And, like Johnson Products, more and more shops are turning to Warner & Swaseys for fast production with less set-up time.

SECRET OF PROFITABLE AUTOMATIC SHORT RUN PRODUCTION—

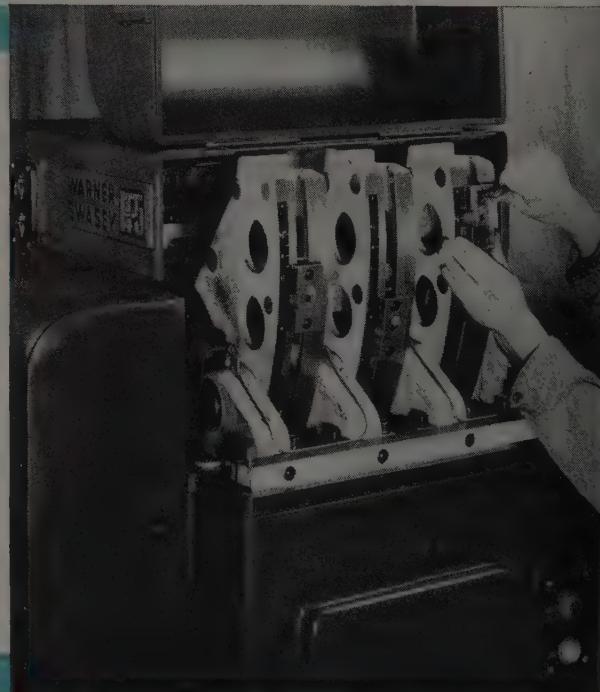
NO CAM CHANGES FOR LONGITUDINAL AND CROSS MOTION

Patented, Quick-Set mechanism, for both longitudinal and cross motion, exclusive with Warner & Swasey Automatics, makes possible an infinite number of work-stroke settings by quick, simple adjustment on a graduated quadrant. Settings can be regulated while machine is in operation.

5-SPINDLE BAR MACHINES—1½" BAR CAPACITY

(Can be furnished on order, with over-sized spindles to handle light work up to 2½".)

5-SPINDLE CHUCKING MACHINE—6" SWING



Full information on these new machine tools will show you how their many new features and design improvements can cut costs, boost production in your shop.

Ask your nearest Warner & Swasey office for full particulars or write to Warner & Swasey, Cleveland 3, Ohio.

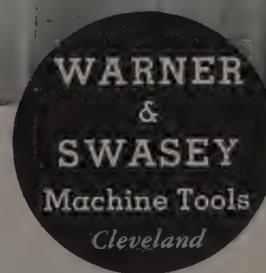
are no problem here . . .

SAME DAY IT WAS DELIVERED!

No specially designed cam sets were necessary to put this Warner & Swasey Multiple Spindle Automatic Bar Machine in operation. A few hours after delivery to Johnson Products Inc., it was turning out parts—setting records for fast production.



You can machine it better,
faster, for less . . . with a
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TURRET LATHES . . . MULTIPLE SPINDLE AUTOMATICS . . . PRECISION TAPPING AND THREADING MACHINES

When typing looks like this...

instead of like this...

Chances are the repair bill will look like this.

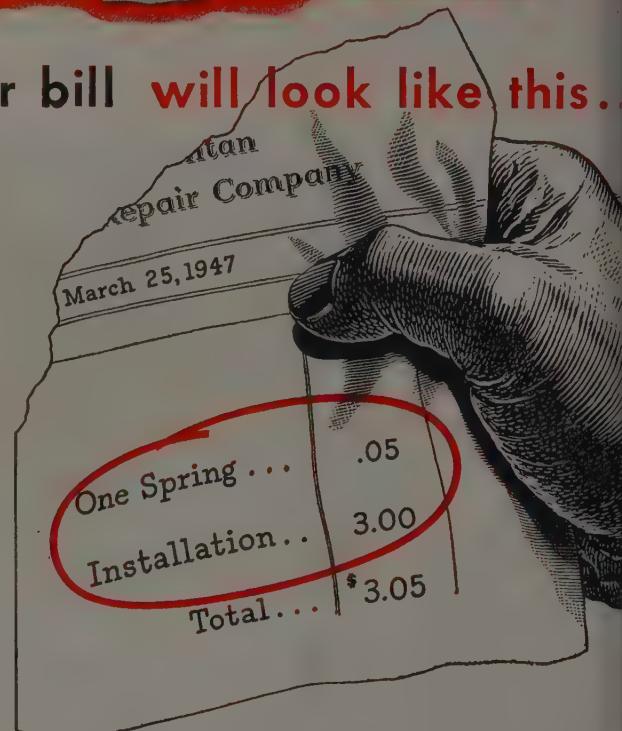
PRECISION springs are not expensive. But the cost of replacing them in a complicated piece of machinery usually is. And when customers must do without a piece of valuable machinery while it is being repaired, and pay repair bills *in addition* . . . the manufacturer of that machine usually loses goodwill.

While spring failures are not ordinary occurrences, they can be reduced to a minimum by using only the very best spring wire in spring manufacture . . . U·S·S American Music Steel Spring Wire.

You can depend on this quality spring wire, whether you manufacture springs yourself or buy them ready-made, for it combines high tensile strength with unusual toughness. You will find that springs made of American Music Wire perform flawlessly under the roughest and toughest treatment . . . and long outlast springs made of ordinary spring wire.

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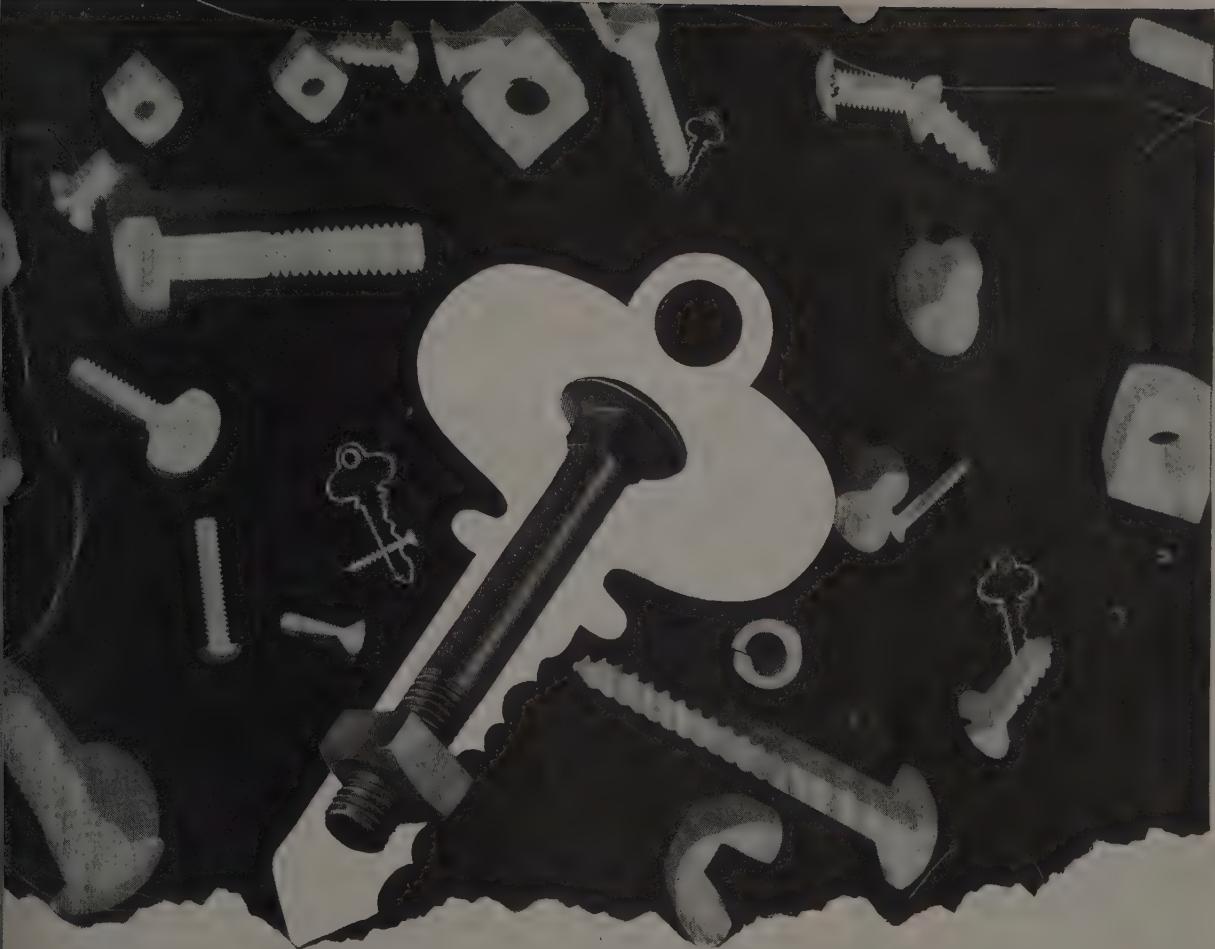
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bolts or nuts, screws or rivets are used in your product, you know how important they can be.

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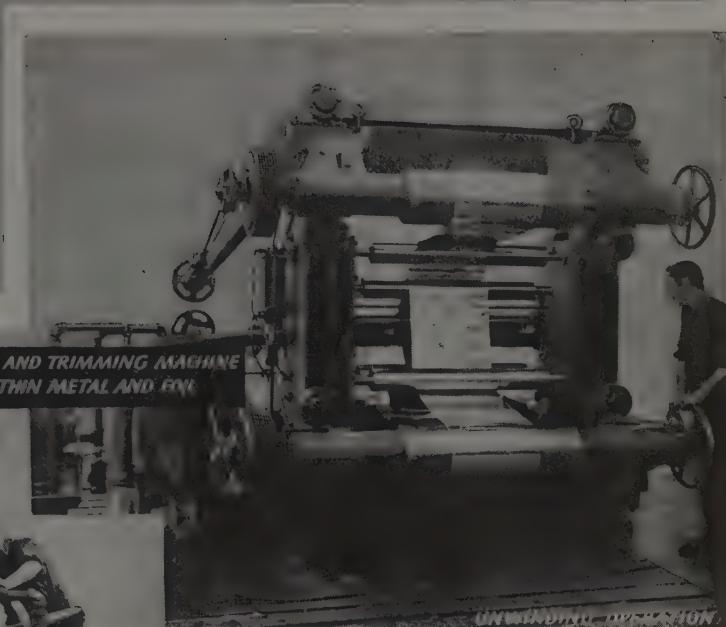
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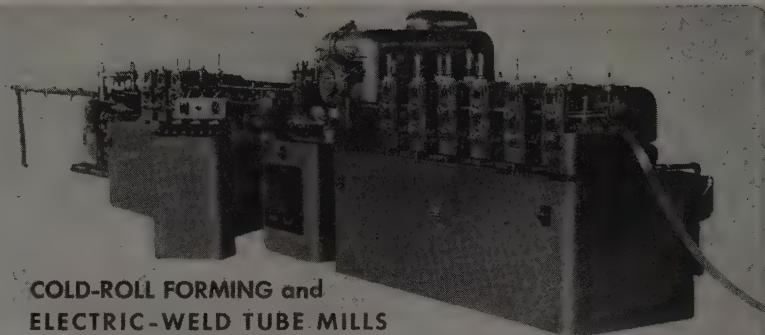
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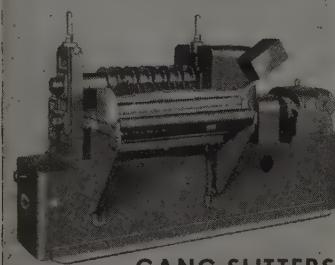
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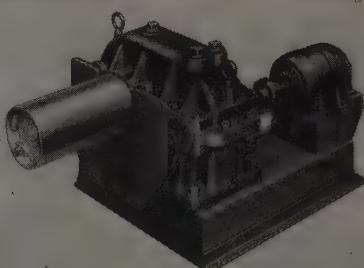
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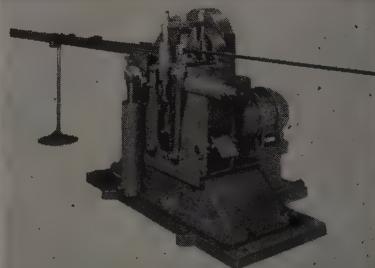
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ELECTRIC-WELD TUBE MILLS



GANG SLITTERS



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ROLL FORMING AND TUBE MILL
MACHINERY

36 YEARS' LEADERSHIP • COILING • SLITTING • FORMING • EMBOSsing • CURVING • WELDING • CUTTING-OFF

SAE 950?

N-A-X high-tensile

When specifications call for SAE 950, you have the right answer in N-A-X HIGH-TENSILE. This low-alloy steel—with inherently finer grain structure—has demonstrated its outstanding properties in factory after factory: high strength, good formability, excellent weldability, high fatigue-resistance, great impact toughness, high corrosion-resistance. Think of N-A-X HIGH-TENSILE when you think of SAE 950. It's a great steel to work with.

MAKE A TON OF SHEET STEEL
GO FARTHER

Specify—

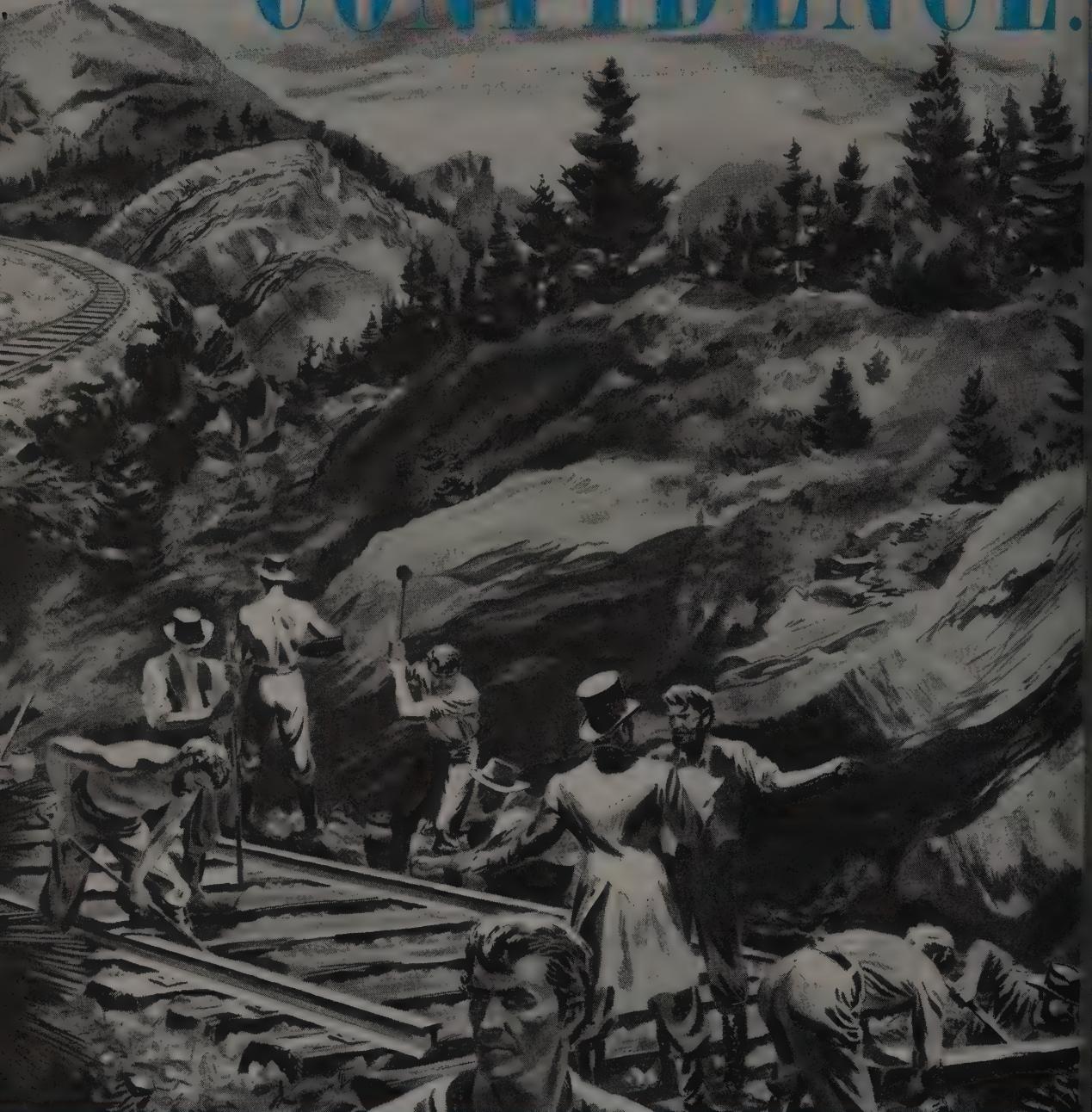


GREAT LAKES STEEL

Corporation

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

CONFIDENCE.



Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

..... how much is it worth?



IN 1846, twenty three years before the Golden Spike was driven at Ogden, Utah marking the completion of the first transcontinental railway, John August Roebling built America's first truly practical, wire rope suspension bridge. This bridge, which carried traffic across the Monongahela River for scores of years, stood as a silent testimonial to his confidence in a principle of bridge building which, in that day, was looked upon with considerable misgiving.

How much is this confidence worth to bridge engineers, and to humanity as a whole, today?

Had it not been for his confidence there would have been no Brooklyn, George Washington nor Golden Gate Bridges. Had it not been for your confidence in the company that bears this pioneer's name, there could have been no John A. Roebling's Sons Company.

Your confidence is valued above all of this company's assets. Every Roebling employee's job depends upon his ability to preserve that confidence by producing better products and by giving you better service than you can find elsewhere.

Any product is only as good as the organization that makes it.

FOR SOMETHING "SPECIAL", SPECIFY ROEBLING WIRE

IT MAY BE a new application for wire . . . or specifications calling for a unique combination of wire qualities. Whatever it is, if you're looking for something "special" in wire, call on Roebling.

Many a new product owes its success to the right wire—made especially for the purpose by Roebling. And it's natural that designers as well as manufacturers think of quality wire as synonymous with Roebling. A pacemaker in wire products for over a century, Roebling has the craftsmen and equipment, the research and engineering facilities, to tackle practically any wire problem.

Your Roebling Field Engineer, equipped by training and wide experience, can offer many valuable suggestions on production short-cuts and savings even in the early stages of the development of your new product. He'll gladly consult with you. Call him at our nearest branch office.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON 2, NEW JERSEY

Branches and Warehouses in Principal Cities



Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE



Exide

IRONCLAD BATTERIES

**BUILT FOR PEAK PERFORMANCE
AND LONG LIFE IN HEAVY-
DUTY SERVICE . . .**

The Exide-Ironclad is a different type of battery . . . in design, construction, service qualities. It was developed to meet the need for a battery to deliver high, sustained power in heavy-duty service over a long period of time.

THE POSITIVE PLATE is unique in battery design. It consists of a series of slotted, vertical, hollow tubes which contain the active material (See illustration at left). The slots in the tubes are so fine that, while they permit easy access to the electrolyte, they prevent the lead oxide from readily washing out, thus adding considerably to the life of the plate.



THE NEGATIVE PLATE has been designed and is built to equal the increased life of the positive plate. Like the positive plate, it has two feet at the bottom to raise it above the two supporting ribs.

SEPARATORS are made of Exide Mipor, a special rubber composition, and will match the long life of Exide-Ironclad plates. The cutaway illustration shows how separators rest on ribs well below bottom of plates, thus making probability of internal short circuits very remote.

THE EXIDE-IRONCLAD ASSEMBLY is sealed in jars of Giant Compound. Jars are practically unbreakable in normal service.

THE RESULT is an efficient, ruggedly built battery that assures dependable performance, long life and maximum economy . . . a battery that fully measures up to each service requirement . . .

★ **HIGH POWER ABILITY** . . . needed in frequent "stop and go" service.

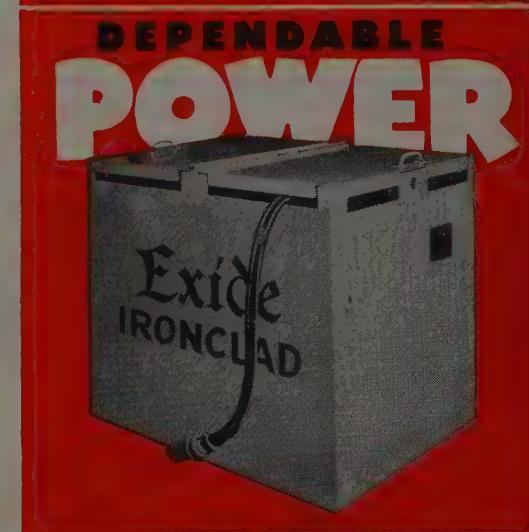
★ **HIGH MAINTAINED VOLTAGE** throughout discharge.

★ **HIGH ELECTRICAL EFFICIENCY** that keeps operating costs low.

★ **RUGGED CONSTRUCTION** . . . for long life.

Exide-Ironclads are supplied in sizes to suit every make and type of electric industrial truck.

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia 32
Exide Batteries of Canada, Limited, Toronto





there's a place for **YOU** at the

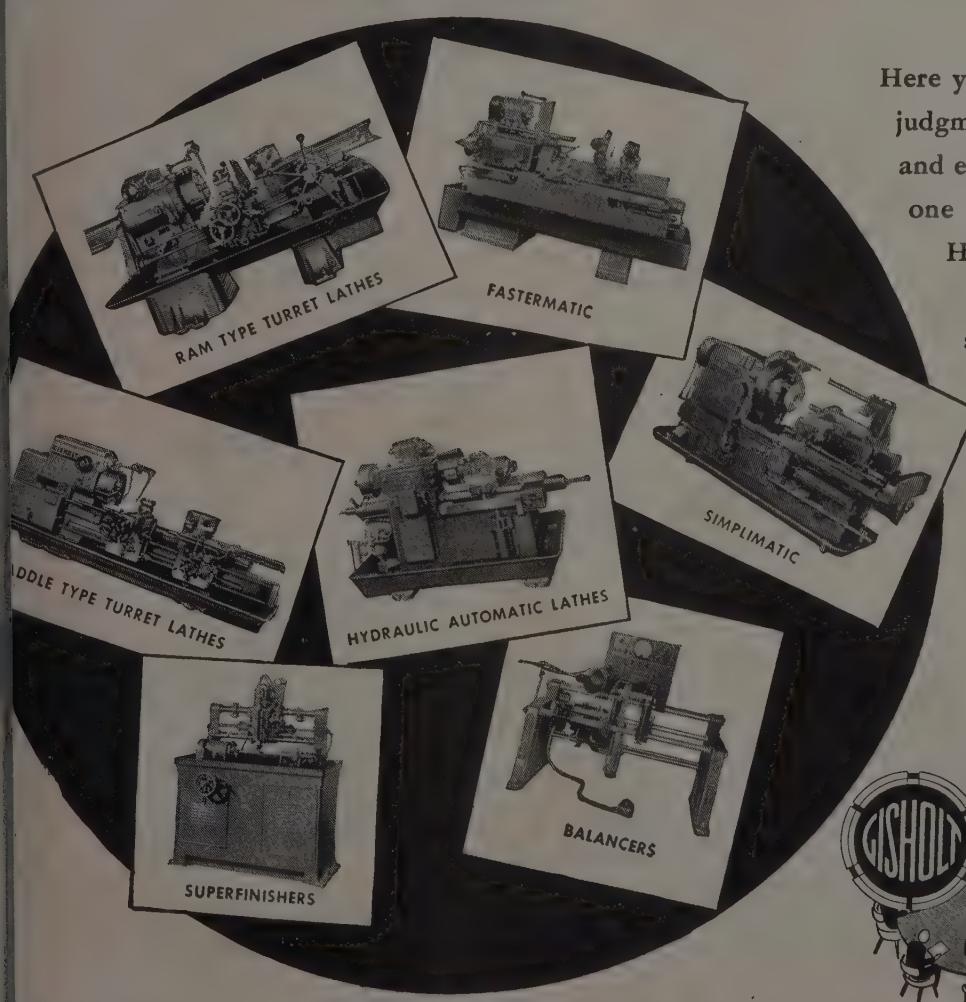
GISHOLT "ROUND TABLE"

Take your place here—whenever you seek new and better methods of producing round or semi-round parts! For this Gisholt "Round Table" symbolizes more than 50 years of collective experience in the manufacture and applications of metal-working equipment. And that experience—practical, authoritative—is yours to use in saving production time and cost.

your problem is carefully studied

Perhaps the solution is already waiting for you. If not, you may be sure that Gisholt's specialists will consider it as their own problem. Whether it involves large or small lot production, they will suggest the methods and equipment best suited to your individual needs.

and the most practical solution is found in the broad Gisholt line



Here you may be sure of unbiased judgment, for Gisholt's interest and experience are not limited to one or two classes of machines.

Here are length and breadth of experience in machining, surface-finishing and balancing round or semi-round parts that are best evidenced in the completeness of the Gisholt line itself.

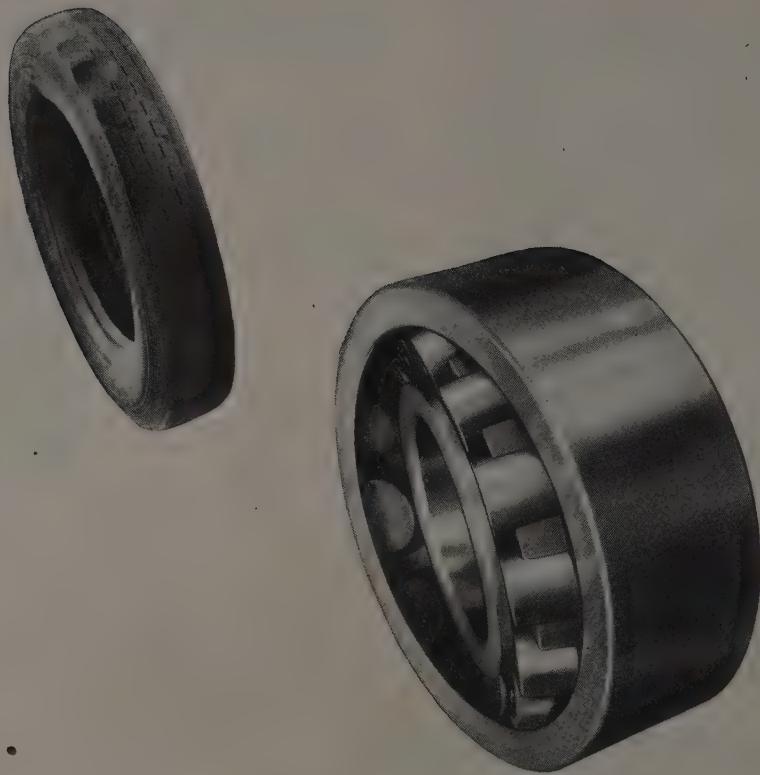
GISHOLT MACHINE COMPANY

Madison 3

Wisconsin



THE GISHOLT ROUND TABLE represents the collective experience of leading specialists in the machining, surface-finishing, and balancing of round and semi-round parts. We welcome your problems.



Mis-alignment that causes wear...

can happen in bearings just as it occurs in an automobile tire when the wheel is "out-of-line." Rapid wear, friction, and stresses caused by mis-alignment can result in premature bearing failure. These factors can be

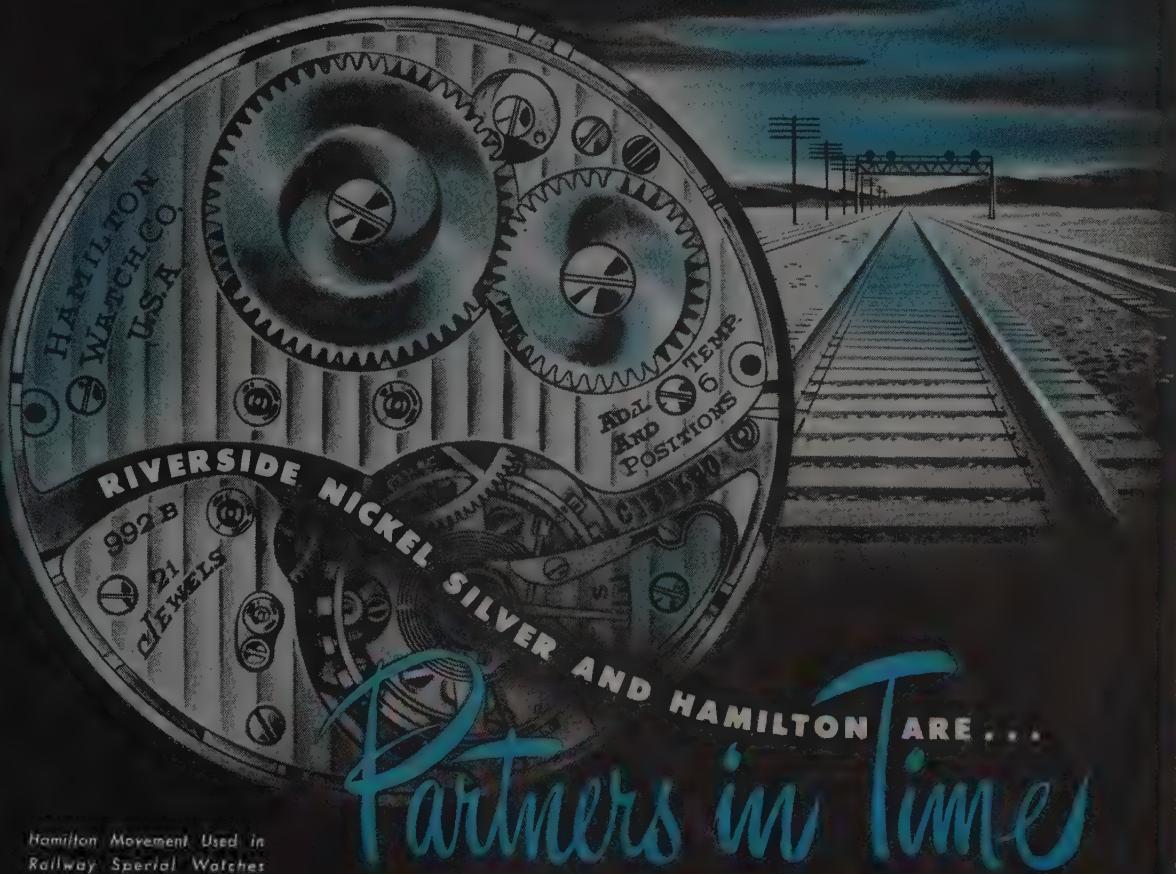
Eliminated with self-aligning bearings

The Torrington *Spherical Roller Bearing* is self-aligning. Any misalignment due to shaft deflection, lack of rigidity or other cause is compensated by the bearing itself—without lessening its radial or thrust capacity.

This unique feature of the Spherical Roller Bearing is responsible for its rapidly increasing use. If you do not have a copy of our Technical Bulletin #200 on this newest addition to the line of Torrington Bearings, a request on your letterhead will bring you a copy promptly.

TORRINGTON BEARINGS

• NEEDLE • SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • BALL •



Hamilton Movement Used in
Railway Special Watches

INSIDE RIVERSIDE

Our wide-spread reputation as specialists in the non-ferrous industry is, we believe, a direct reflection of our painstaking research and care in treating each problem individually. Box score to date: Production of 50 distinct alloys for customers' individual requirements.

For more than 55 years the Hamilton Watch Company has turned out railroad, navigation and personal timepieces of meticulous accuracy. And the makers of the famous "Watch of Railroad Accuracy" have long been a customer of Riverside.

Plates and bridges in the movements of Hamilton Watches are Riverside Nickel Silver . . . for three important reasons: 1. Riverside Nickel Silver, though tough, is easy to machine in any manner, providing great strength in tapped holes. It is highly resistant to wear, fatigue and corrosion. 2. It is easily worked and gives utmost satisfaction in fabrication and performance. 3. Riverside Nickel Silver is silvery white clear through. It takes a high polish or a fine damaskeen-type finish.

Riverside Nickel Silver is widely used whenever a combination of beauty, durability and economy is essential in a metal.

For more information and interesting catalogs about Riverside Nickel Silver and Riverside's two other alloys, Phosphor Bronze and Beryllium Copper, write today.

RIVERSIDE

THE RIVERSIDE METAL COMPANY

HAMILTON, NEW JERSEY

DISSTON NICROMAN

MIX 827

AN "ALL PURPOSE" TOOL STEEL
OF EXCEPTIONAL TOUGHNESS

STEEL . . . Everybody who wants to obtain steel, can help himself to get it by immediately starting scrap into the channels that serve steel mills.



A sharp, durable punch made of Nicroman and used for punching out window sash sections

ANALYSIS

Carbon	70%
Manganese	.40%
Silicon	.20%
Nickel	1.65%
Chromium	1.00%
Copper	.35%

BECAUSE of its versatility, many companies have adopted Nicroman for use in all their tools except those requiring high speed steel. It is extensively used for knives, chisels, punches, hammers, pins, stamps, dies, many others . . . and with unusual success.

In the Disston plant Nicroman is used on the shears of bar mills where many different shapes and sizes are handled, and of various degrees of hardness—.10% carbon iron, .90% carbon steel to 1.60% carbon file steels. Some are sheared hot, some cold, but Nicroman blades have proved equal to them all.

Nicroman combines the toughness and long wear of the best of the low alloy steels with the absence of distortion sometimes encountered with the regular high alloy oil-hardening steels.

A study of your tool steel needs will likely reveal many applications where Nicroman can be used to advantage. If so, you will be able to effect important savings in inventory stocks, avoid the misuse of brands, and simplify heat treating.

DISSTON ENGINEERS WILL BE GLAD TO HELP YOU SOLVE YOUR TOOL STEEL PROBLEMS

Whether your tool steel problems are simple or complex, Disston engineers and metallurgists will be glad to help you find the right solution. They will advise you frankly, without obligation, and in confidence.



Big Brute

ton capacity

depth of throat

druple drive

and bed area of
(F to B) x 288" (R to L)

weight over 400,000 lbs.



This
Verson PRESS is helping
put roofs over
homeless heads!



Another of the many unusual jobs being handled on Verson Presses.



Whether it's tough combination multiple punching and forming such as is handled by the press shown above, or a job requiring press equipment that has never before been built, more and more manufacturers are taking advantage of Verson's engineering skill and press building ability. Pioneers in the field of modern press development, Verson originated Allsteel Welded Construction over 25 years ago and has steadily added to its list of achievements.

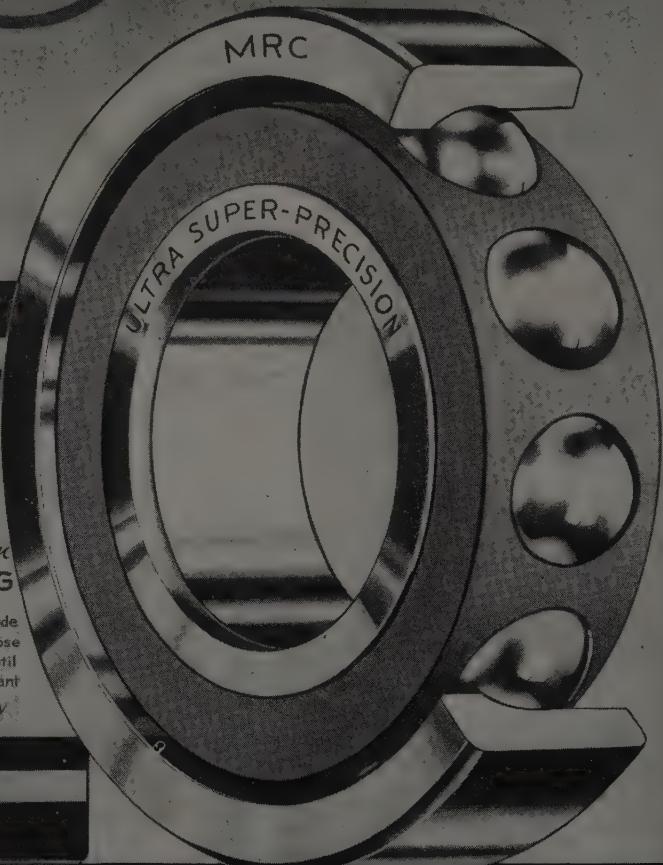
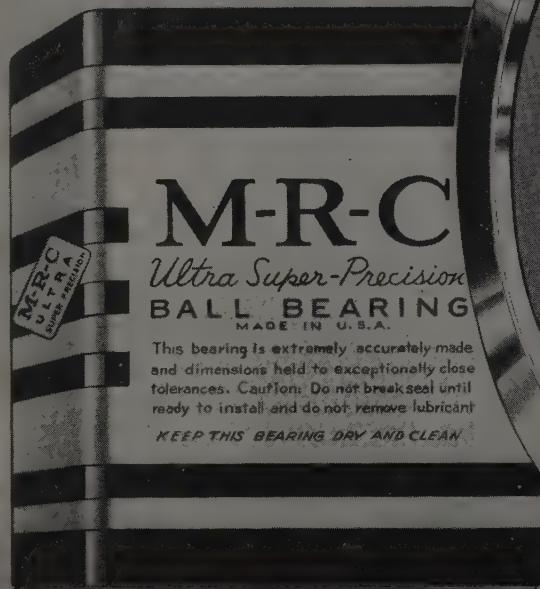
What's your problem? Let us talk it over with you.

VERSON ALLSTEEL PRESS CO.

9318 S. Kenwood Ave. Chicago 19, Illinois

Originators and pioneer builders of Allsteel Welded Presses

40
years of
LEADERSHIP



MARLIN-ROCKWELL CORPORATION Executive Offices: JAMESTOWN, N. Y.

UPSON



A NAME THAT MEANS

Top Quality

IN BRIGHT CAP SCREWS

For 93 years, the name UPSON has represented highest quality headed and threaded products. Today you get this same unvarying Top Quality throughout a complete size range of bright hex head cap screws —when you specify Republic UPSON Quality.

REPUBLIC STEEL CORPORATION

BOLT AND NUT DIVISION • CLEVELAND 13, OHIO
Export Department: Chrysler Building, New York 17, N. Y.



REPUBLIC *Upson
Quality*

BOLTS AND NUTS

Other Republic Products include Pipe, Sheets, Tubing, Hot Rolled and Cold Drawn Bars—Carbon, Alloy and Enduro Stainless Steels

NOW It's Easier to

WITH THESE



W-32 for formerly "hard-to-weld" steels

Type W-32 is a lime-ferritic electrode especially developed for successful production welding of so-called "problem" steels—cold rolled, high-carbon, high-sulphur, and steels of high hardenability which are susceptible to underbead cracking. With stable arc characteristics providing good directional control, W-32 offers the following primary advantages:

1. Elimination of underbead cracking on hardenable steels.

Copyright 1947 General Electric Company

2. Material reduction in hydrogen content of the weld metal produces welds that can be successfully enameled without heat treatment.
3. Marked decrease in tendency for surface holes to occur when base metal is high in sulphur content.
4. Excellent appearance of finished welds.
5. Spatter is minimized, deposition efficiency is high, penetration is adequate but not excessive, and slag is sufficiently heavy and fluid to provide good protection against oxidation; and the new, improved version of this electrode is suitable for welding in all positions with either reverse-polarity d-c or a-c.

If you are welding any of these steels, you'll want to investigate W-32. Too, you may want to consider the use of special steels such as free machining or cold-rolled, which welding limitations have heretofore ruled out. W-32 has removed these limitations.

STAINLESS STEEL ELECTRODES

G.E. has just recently introduced an outstanding line of stainless steel electrodes—27 types in all, including both Lime and Titania type coatings—for better welding of all AISI standard analyses of stainless. For information on these, W-32, W-2075, or any G-E arc-welding electrodes, equipment, or accessories . . .

... CONSULT YOUR NEAREST G-E ARC-WELDING DISTRIBUTOR.
Apparatus Department, General Electric Company, Schenectady 5, N.Y.

HERE'S WHAT
USERS SAY
ABOUT



ELECTRODES

GENERAL ELECTRIC

Weld

"Problem Metals"

NEW G-E ELECTRODES



W-2075 for making machinable welds on cast iron

This latest addition to the G-E electrode line has been developed specifically for making machinable welds on cast iron. It is equally suitable for both welded fabrication of cast iron and for repair work, and is extremely useful for filling

holes and making repairs on castings.

Numerous applications are to be found in repairing motor blocks, radiators, machined parts, and other cast-iron sections requiring machining, drilling, or tapping; it is also recommended for welds where pre-heat cannot be used.

Weld deposits are smooth, uniform, and well bonded to the cast material; they are free from internal and surface porosity. The ability of the deposited metal to bond readily with the cast material, plus the absence of any large volume of slag, makes W-2075 usable in *all* positions with either a-c or d-c.



This cast block has been V'd out, welded with W-2075, and then drilled and threaded. Note the excellent bond between weld and parent metal and the absence of cracks and porosity.

VERSATILE W-20 ELECTRODE REDUCES ROD STOCKS

"Our continued purchases of G-E W-20 electrode over a number of years have been made as a result of the tested adaptability and versatility of this general purpose rod. Through its use in various phases of road machinery fabrication, we have found it possible to cover a multitude of welding applications without the necessity of stocking a large variety of welding rods.

"In our production of large road building equipment there is need for an electrode which is particularly adaptable to poor fit-up work and can be used in all positions. We have found the W-20 electrode not only answers these requirements, but could be employed

with either A-C or D-C machines, insuring the utilization of all available welding units on a single production line, if so desired.

"We sincerely appreciate your cooperation and many helpful welding recommendations—in particular, those in reference to the application of the versatile W-20 electrode."

Yours very truly,
W. A. RIDDELL CORPORATION
(Bucyrus, Ohio)
By:
Jacque Jones
General Manager



VICTOR

IT COSTS LESS TO OWN AND OPERATE

VICTOR EQUIPMENT COMPANY
SAN FRANCISCO, LOS ANGELES • CALIFORNIA

IT TAKES 2 KINDS OF ENGINEERING TO MAKE A



When your spring specifications call for extra close limits, accuracy at different load tests, tricky bends or end treatment—it's no simple matter to meet them—without costly second operations—unless

. . . . someone gives those specifications a good going over for production problems. Here at Wallace Barnes are men who know how to utilize machinery, materials and methods to get the results you want, in the fewest operations. This knowledge, applied in the early stages of your design, may also simplify your problems—or help to avoid costly and unnecessary motions. It's worth a try; next time you plan a spring, let us help, too!

Wallace Barnes SPRINGS

SMALL STAMPINGS • WIRE FORMS • HAIRSPRINGS • COLD ROLLED SPRING STEEL

WALLACE BARNES COMPANY
BRISTOL, CONN.

DIVISION OF THE ASSOCIATED SPRING CORP.

AND IN CANADA, THE WALLACE BARNES CO., LTD., HAMILTON, ONTARIO



Texas Fields to Supply Fuel for Southland

In the purposeful din of the Consolidated Steel Corp., 5700 S. Eastern Ave., workmen are shaping the future of Los Angeles for another generation.

Every four and a quarter minutes, they are turning out a 60-foot section of high strength pipe 30 inches in diameter, through which the gas needed for Los Angeles' homes and industry will flow from the oil fields of Texas.

New Process Used

Charles W. Crawford, vice-president of Consolidated Steel, said the pipe is being fabricated by a process new to the West Coast in that it embodies continuous welding of the longitudinal seams and hydraulic expansion of the welded pipe sections.

Write us—we will suggest the best type for your requirements

Berkeley Continuous Longitudinal Seam Welders are welding "the biggest" inch

These "Berkeleys" are welding "the biggest inch"—are turning out 60 foot sections of perfectly welded 30" diameter "high test" pipe every 4½ minutes.

"Berkeleys" were chosen to weld the largest diameter high-pressure gas transmission line ever built for a good reason—they deliver uniform, high quality welds continuously, day after day on a high production basis.

There's a "Berkeley" to weld preformed tubes 5" to 36" in diameter. If you are welding pipe, tanks or any tubular shape, investigate the time and cost saving advantages of a "Berkeley."

PENN TOOL & MACHINE CO.

Builders of production welding machines, jigs and fixtures

DANVILLE, ILLINOIS

Continental

ROLLING MILLS

... built by the engineers who designed
America's foremost installations



Continental
FOUNDRY & MACHINE CO.
CHICAGO - PITTSBURGH

Plants at East Chicago, Ind., Wheeling, W. Va., Pittsburgh, Pa.



Industry's Headquarters for
Carbon and Alloy Steel Castings
Rolling Mills and Equipment
Iron and Steel Rolls



at Continental

50 pound or 250,000 pou

Castings



...are all in a day's work!

Whether it be the "mass" production castings, the "ordinary" type casting or those castings demanding extraordinary skill and experience—CONTINENTAL services and strategically located facilities are ever at your command.



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FOUNDRY & MACHINE CO.
CHICAGO • PITTSBURGH

Printed from Chicago Mill & Mining Company's paper

STEEL TUBING



MECHANICAL TUBING

SEAMLESS

WELDED

CARBON

ALLOY

STAINLESS

AIRCRAFT TUBING

PRESSURE TUBES

SEAMLESS-WELDED

BOILER TUBES

CONDENSER TUBES

EVAPORATOR TUBES

HEAT EXCHANGER TUBES

SEAMLESS STEEL PIPE STAINLESS STEEL PIPE

TUBULAR SERVICE CORPORATION

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NEW ENGLAND SALES REPRESENTATIVE
TUBULAR SALES INCORPORATED, 137 SPRING ST., EVERETT 49, MASS. (BOSTON DISTRICT)

A Complete Tubular Service



Nowhere is there a better example of Washburn care and precision than in Eagle MUSIC WIRE. Our own basic steel—close tolerances and care in handling, all make for superlative quality.

WASHBURN

WASHBURN WIRE CO., NEW YORK CITY

CLEAN, -UNIFORM BILLETS—STRIP—RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

How long have you used
SUPEREX behind
refractory linings?

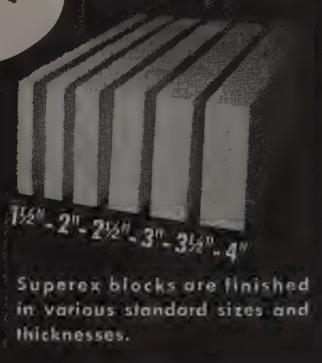
**20 YEARS... it's still tops
for
temperatures up to 1900 F**

**YES, for over 20 YEARS SUPEREX
has never been surpassed**

SUPEREX is industry's leading block insulation . . . in hot blast stoves, mains, bustle pipes, kilns, regenerators, roasters, high temperature mains, flues, stacks, industrial and metallurgical furnaces, stationary and marine boilers and auxiliary power plant equipment—wherever the insulation must withstand temperatures up to 1900 F behind a refractory lining.

These seven reasons will tell you why:

1. **Low Thermal Conductivity**—Superex is made from specially selected calcined diatomaceous silica, bonded with asbestos fibre—presenting a formidable barrier to the passage of heat.
2. **High Heat Resistance**—J-M Superex Blocks safely withstand temperatures up to 1900 F without deterioration.
3. **Light Weight**—Approximately 24 lbs. per cu. ft.
4. **High Physical Strength**—Withstands vibration and other physical abuse encountered in normal service.



Approximately five tons pressure per square foot are required to compress Superex $\frac{1}{8}$ inch.

5. **Permanent Efficiency**—Superex maintains high thermal efficiency indefinitely—will not disintegrate in service for which recommended.

6. **Quick Application**—The convenient sizes and light weight of Superex assure fast, economical installations.

7. **Easy Cutting and Fitting**—Superex is easily cut with an ordinary knife or saw for fitting around openings or irregular surfaces.

Special shapes and curved blocks—in addition to the 6 standard thicknesses illustrated—can be supplied. Write Johns-Manville, Box 290, New York 16, N. Y.



JOHNS-MANVILLE *First in INSULATIONS*

PENNSALT CLEANERS

help put a brighter finish

on cabinet hardware by

STANLEY



The Stanley Works—a well known name in hardware—manufactures fine hinges and other cabinet fittings. For many years, these hinges have been cleaned with Pennsalt Cleaners prior to bright nickel plating.

Recently, Stanley installed a power spray washer . . . which involved a change in cleaning technique, because brass and steel had to be cleaned in the same cycle. The Pennsalt technician offered a compound suitable to meet the exacting requirements. Result: satisfactory cleaning of fully assembled parts, both brass and steel prior to bright nickel and chromium plate.

SEND FOR COMPLETE DETAILS ON THIS CASE

If you'd be interested in complete details on this case, write to our Special Chemicals Division and ask for Case Report No. 62-4. And while you're at it, why not jot down your current problems in cleaning, plating or enameling. We can put a highly trained representative in touch with you in a matter of hours . . . with no obligation.



CHEMICALS

97 YEARS OF SERVICE TO INDUSTRY

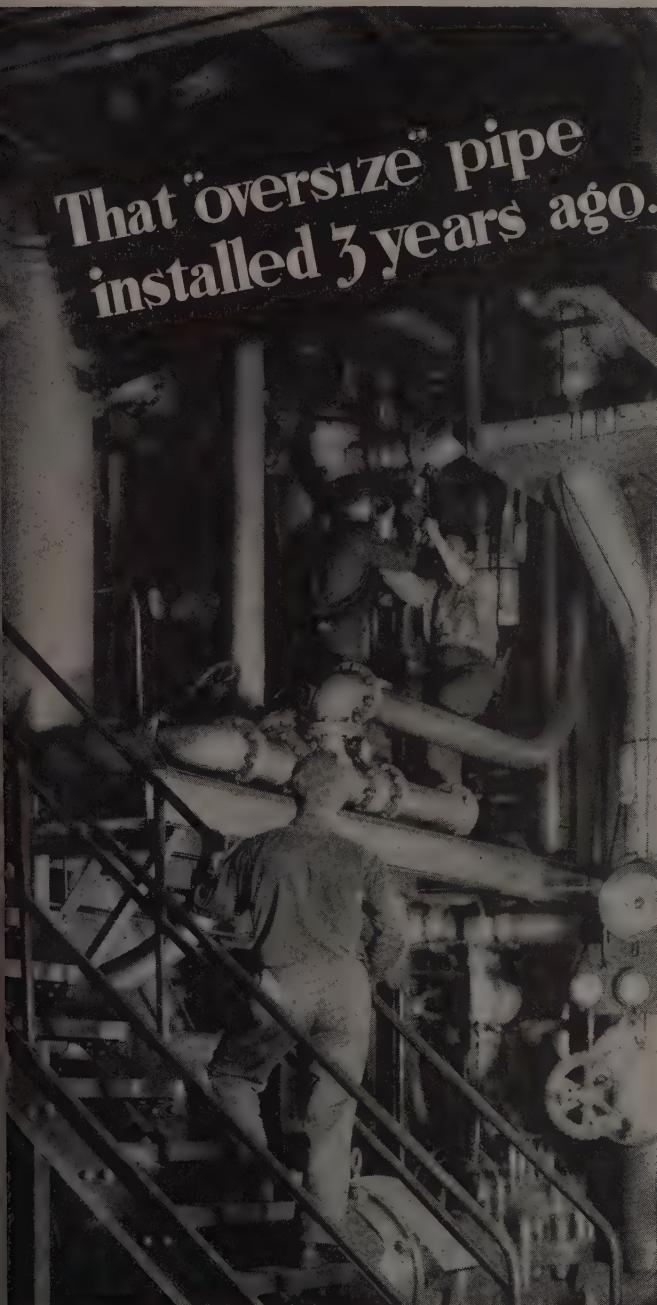
PENNSYLVANIA SALT MANUFACTURING COMPANY

SPECIAL CHEMICALS DIVISION • 1000 WIDENER BUILDING, PHILADELPHIA 7, PA.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • WYANDOTTE • TACOMA • PORTLAND, ORE.

INSTALL STEEL PIPING ADEQUATE FOR TOMORROW'S NEEDS

That "oversize" pipe
installed 3 years ago...



takes care of the
new extension



THE owner of an eastern food plant is congratulating himself on what he had always thought was an extravagant, though necessary investment. A few years ago, when he installed new processing equipment, the only pipe he could secure quickly was what he thought was "oversize." But he put it in.

Now greater demand for his product is leading him to increase his plant capacity. One thing he isn't worrying about is his piping system. That "oversize" pipe of 3 years ago is adequate to handle the extension. Today he knows it was an excellent investment.

Too many owners--and contractors, too--are inclined to rely on minimum pipe sizes--not anticipating that what's barely adequate now may soon be completely inadequate. Remember--it's long runeconomy to install steel pipe adequate to do a job today AND TOMORROW.

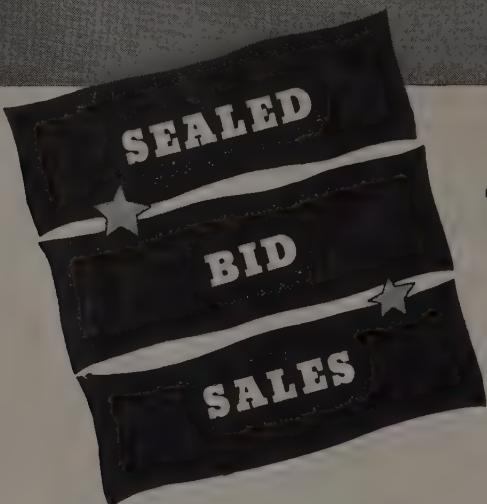
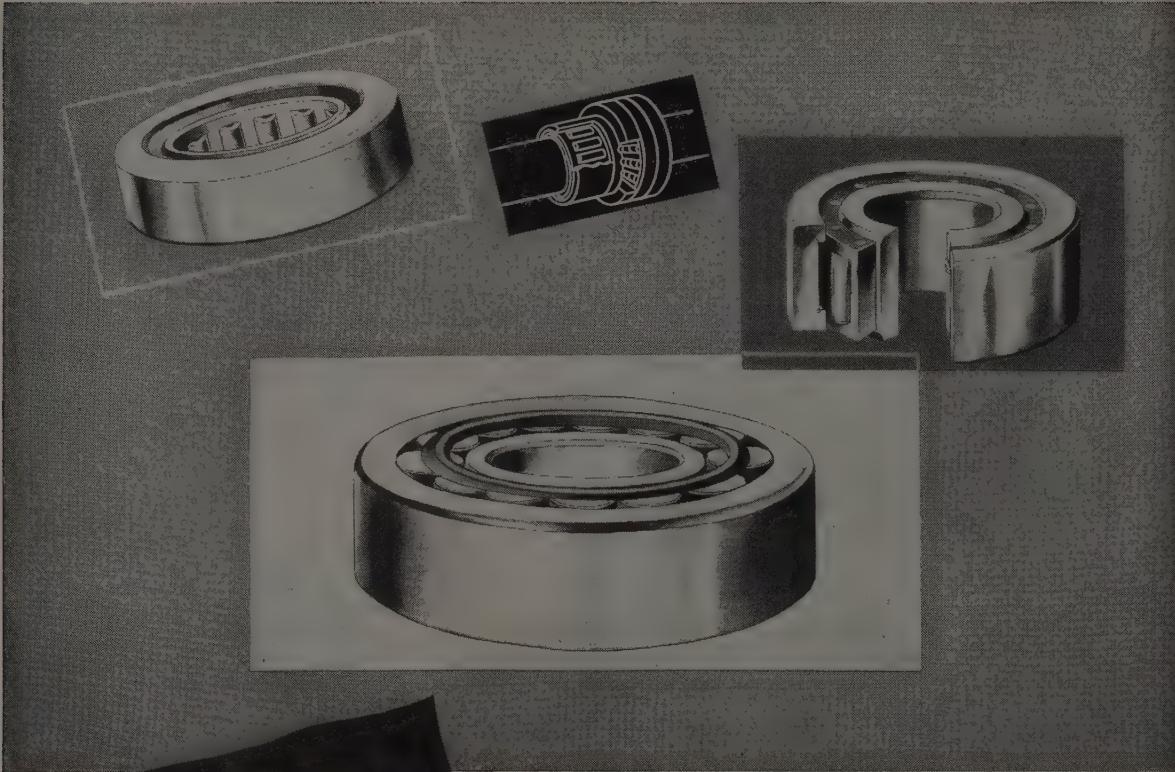
Distributors in all industrial markets handle Youngstown pipe in a wide range of sizes.



YOUNGSTOWN
YOUNGSTOWN

Pipe and Tubular Products
Electrolytic Tin Plate

YOUNGSTOWN
THE YOUNGSTOWN SHEET AND TUBE COMPANY
GENERAL OFFICES - YOUNGSTOWN 1, OHIO.
Export Offices - 500 Fifth Avenue, New York City
Manufacturers of
CARBON - ALLOY AND STAINLESS STEELS



UNUSED BEARINGS

Sales of bearings will be held at frequent intervals. To receive information on future sales, write to the Regional Offices listed below and ask that your name be placed on their mailing lists.

BOSTON
CINCINNATI
CHICAGO
CLEVELAND
ST. LOUIS
LOS ANGELES
DETROIT
NEW YORK
KANSAS CITY
ATLANTA

OFFICE OF GENERAL DISPOSAL

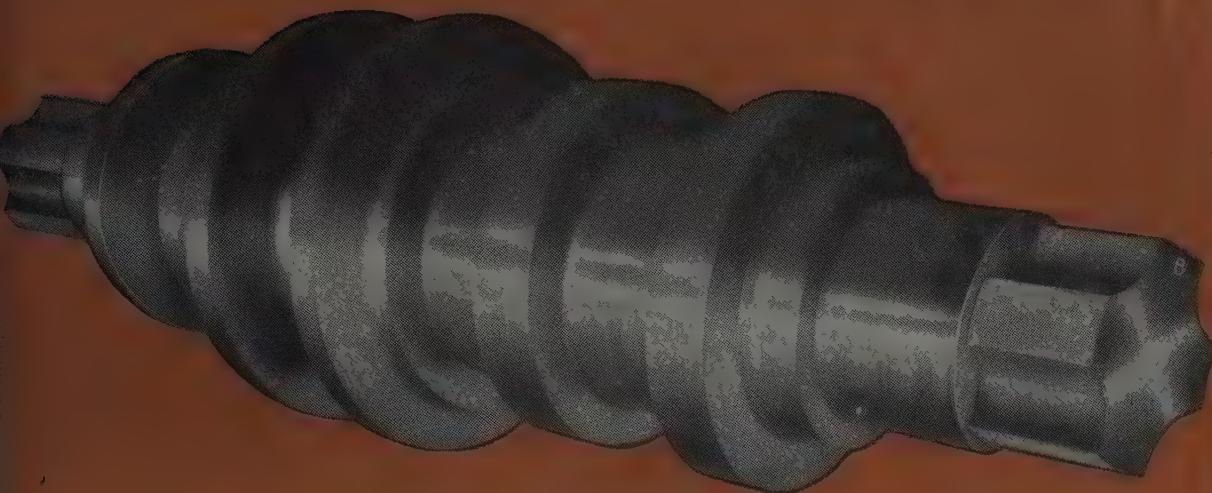
WAR ASSETS ADMINISTRATION

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago
Cincinnati • Cleveland • Denver • Detroit • Grand Prairie, Tex. • Helena • Houston
Jacksonville • Kansas City, Mo. • Los Angeles • Louisville • Minneapolis • Nashville
New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond
Salt Lake City • St. Louis • San Antonio • San Francisco • Seattle • Spokane • Tulsa



1119

Where STRENGTH is the Prime Requirement



BIRDSBORO

30

ROLLS

Birdsboro 30 Rolls are the strongest and toughest of Alloy Steel Rolls used for blooming, cogging and roughing—Aircraft Quality Steel (High Percentage Alloy Type)—Stainless Steel (High Percentage Alloy Type)—High Speed Steel—and all rollable steel that is very difficult to reduce because of density.

Consult our Roll Engineers if you are experiencing difficulty with Rolling Ingots and Billets of the above steels.

BIRDSBORO STEEL FOUNDRY & MACHINE COMPANY • BIRDSBORO, PENNSYLVANIA
Manufacturers of Steel Mill Equipment, Iron and Steel Rolls, Hydraulic Presses, Crushing Machinery, and Special Machinery

BIRDSBORO

ROLLS



Constant High Quality

with Uniform

Gas heating

Uniform heat, at precise temperatures, assures the constant high quality of Maendler paint brushes. Three automatic, clock-controlled vulcanizing ovens guarantee the exact time-temperature relationship for sealing set-in-rubber bristles; GAS, dependable heat source for toughest industrial heating problems, insures uniform oven temperatures.

The controllability of GAS proved an asset to production at the Maendler plant. By charging the ovens at the end of the normal working day, one extra vulcanizing cycle can be completed after-hours . . . with automatic time and safety controls substituting for the operator.

Efficiency of Gas-Fired Equipment, and economy of GAS for industrial heating, have been demonstrated in thousands of unusual applications. Industrial Engineers at your local Gas Company will analyze your heating problems and make recommendations based on latest developments.

*Photo by DESPATCH OVEN COMPANY
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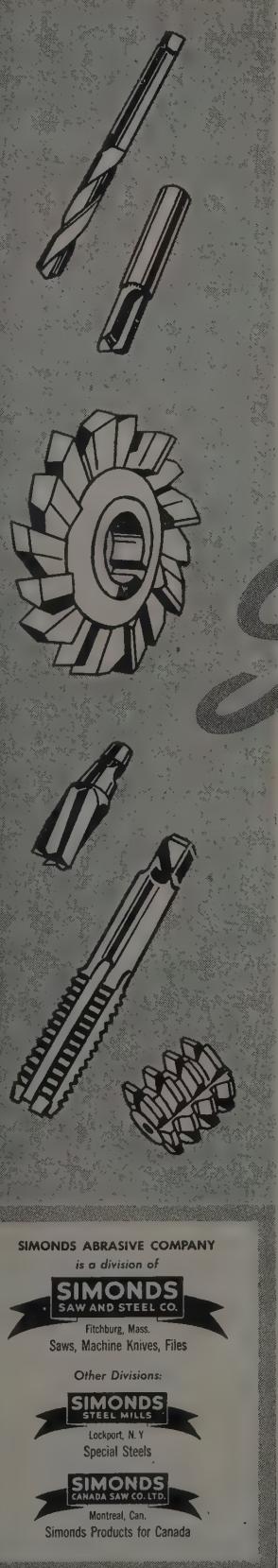
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NO OTHER ACID-PROOF CEMENT CAN COME CLOSE
TO STAMINITE EITHER IN EASE OF APPLICATION
OR IN PERFORMANCE. HERE IS WHY . . .

1 EASY TO MIX — Robinson Staminite Acid-Proof Cement is factory mixed. Simply add water according to directions and use as any cement mortar. No job failure can result from improper mixing. No bulky drums of solvent to handle.

2 EASY TO APPLY — Anyone who has used a trowel can apply Staminite. No difficult masonry technique is needed to get a good job with Staminite. Installation is quick and inexpensive.

3 WATER-PROOF — Staminite is water-proof to the point of actually becoming harder under water. This outstanding feature allows pickling tanks or other installations to be flushed with water without damage to the cement.

4 ACID-PROOF — Resistant to oils, solvents, neutral salts. Proof against all acids, hot or cold, except hydrofluoric.

5 BEST FOR SULPHURIC ACID CONDITIONS — Low fluorine content of Staminite (only 2% compared with the usual 8%) makes it far superior where sulphuric acid conditions are encountered.

6 ABRASIVE RESISTANT — Staminite Acid-Proof Cement is harder . . . more resistant to abrasive action. This feature permits the use of Staminite in many installations not possible with ordinary acid-proof cements.

7 SETS CHEMICALLY — Staminite does not depend on acid washes to become acid-proof, or on contact with air to become hard. It sets *chemically* without interfering with brick-laying.

8 STRONGER . . . LONGER LASTING — At the end of seven days, Staminite is acid-proof and water-proof, and equal or superior in durability to the best cement mortars.



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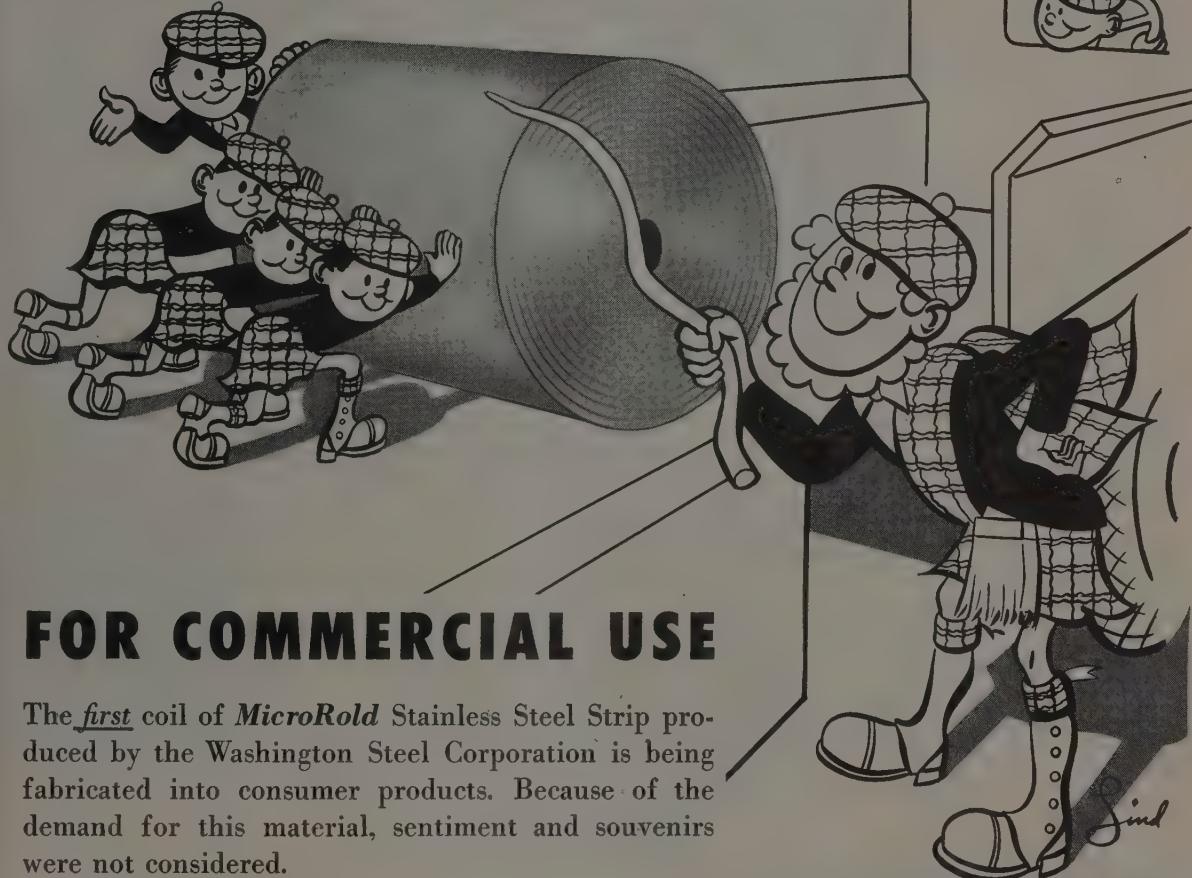
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R-347-23

The First Coil



FOR COMMERCIAL USE

The first coil of **MicroRold** Stainless Steel Strip produced by the Washington Steel Corporation is being fabricated into consumer products. Because of the demand for this material, sentiment and souvenirs were not considered.

MicroRold Stainless Steel Sheet and Strip are produced remarkably uniform to gauge through the entire cross section and length. Both sheet and strip are rolled in widths up to 36 inches and in gauges from .078 to .004 inch in commercial grades, finishes, and tempers.



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In circular and flat forming tools, as in all other cutting tools, the toughness and hardness of MO-MAX assure better performance.



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"MO-CUT"	Braeburn Alloy Steel Corporation
"STAR MAX"	Carpenter Steel Company
"MOLITE M-1"	Columbia Tool Steel Company
"REX T-MO"	Crucible Steel Company of America
"DI-MOL"	Henry Disston & Sons, Inc.
"HI-MO"	Firth-Sterling Steel Company
"REX T-MO"	Holcomb Steel Company
"MOGUL"	Jessop Steel Company
"TATMO"	Latrobe Electric Steel Company
"MIDMAX"	The Midvale Company
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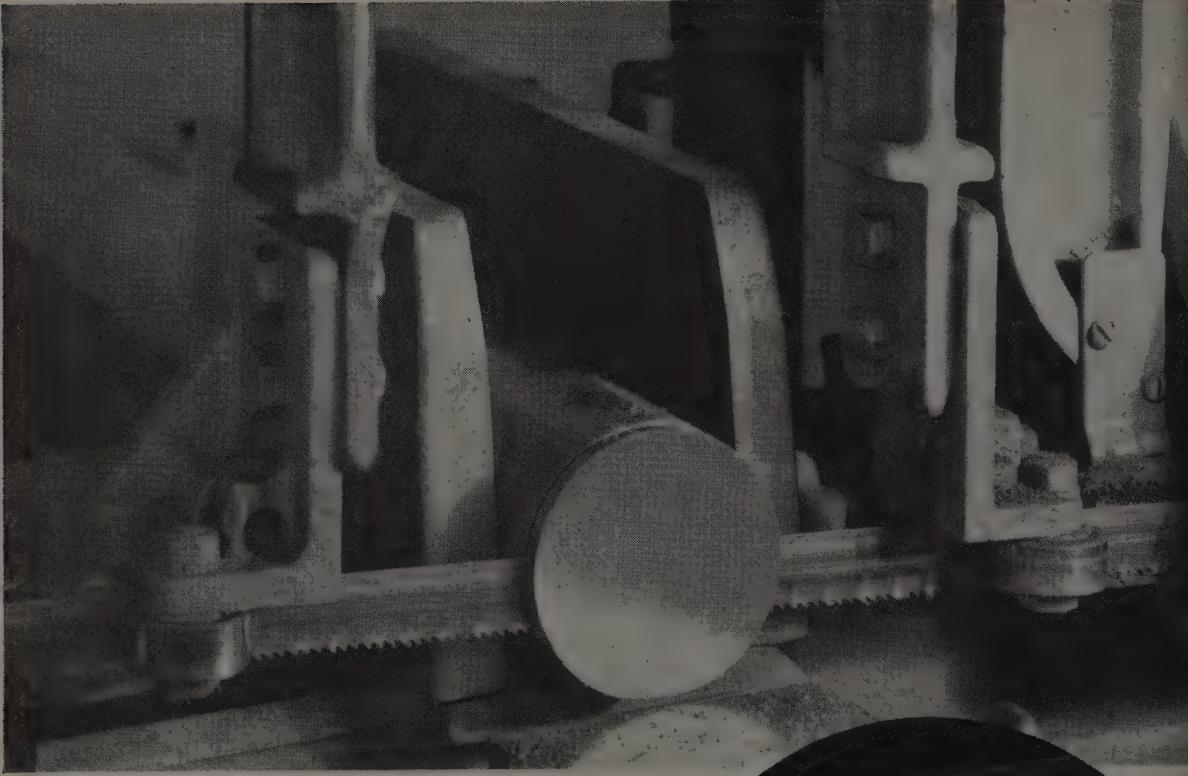


Bell Aircraft Corporation, manufacturers of the famed Bell Helicopter, the Modern Magic Carpet, solved an expensive intraplant transportation problem with a Plymouth Gasoline Locomotive. The Bell plants at Niagara Falls, New York, are located at some distance from regular rail lines, making it necessary to have train crews travel from the nearest junction point to spot cars for shipment.

A Plymouth Locomotive has eliminated this costly method, now handles all the intraplant switching and haulage, economically and dependably. As Bell reports: ". . . our Plymouth Locomotive is used extensively . . . has proved invaluable." Plymouth has the answer to your intraplant transportation problem. . . write today for complete information. Plymouth Locomotive Works, Dept. A1, Plymouth, Ohio.

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Climb on the SIMONDS "BAND-SAW WAGON"

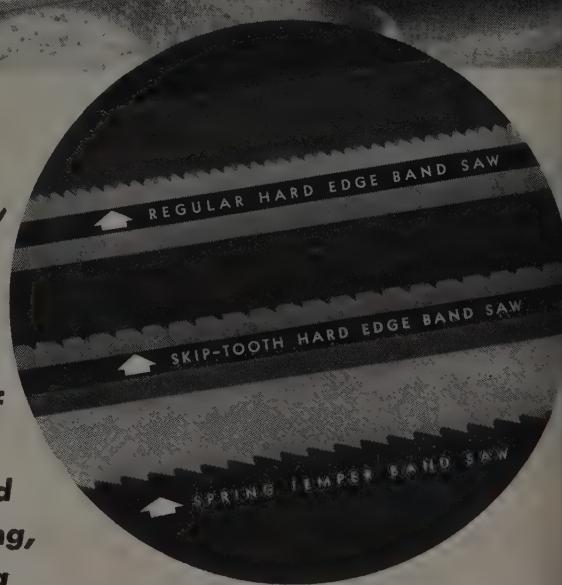


Save Thousands of
Hours by Band-Saw
Cutting . . . instead
of Shaping, Milling,
Turning, Drilling

way shops are swinging to metal band-sawing . . . and keeping their one-purpose machines free to do the work for which they were designed.

Simonds Metal-Cutting Band Saws can do a score of jobs, and do them all at top speed and accuracy . . . cut-off work, contour cutting, and cutting of irregular shapes like jigs, dies, fixtures, as well as heavy straight production cuts . . . and many other similar jobs.

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Getting to be a "Big Parade" . . . the way shops are swinging to metal band-sawing . . . and keeping their one-purpose machines free to do the work for which they were designed. Simonds Metal-Cutting Band Saws can do a score of jobs, and do them all at top speed and accuracy . . . cut-off work, contour cutting, and cutting of irregular shapes like jigs, dies, fixtures, as well as heavy straight production cuts . . . and many other similar jobs. And Simonds Metal Bands earn top profits on these jobs because they're made to stay on the job many hours longer . . . running smoothly, easily, cleanly. Simonds special steel, perfect tooth-milling and even tooth-set . . . those are the Simonds extras that pay you extra on every Simonds Metal Band you buy. Order from your distributor today.

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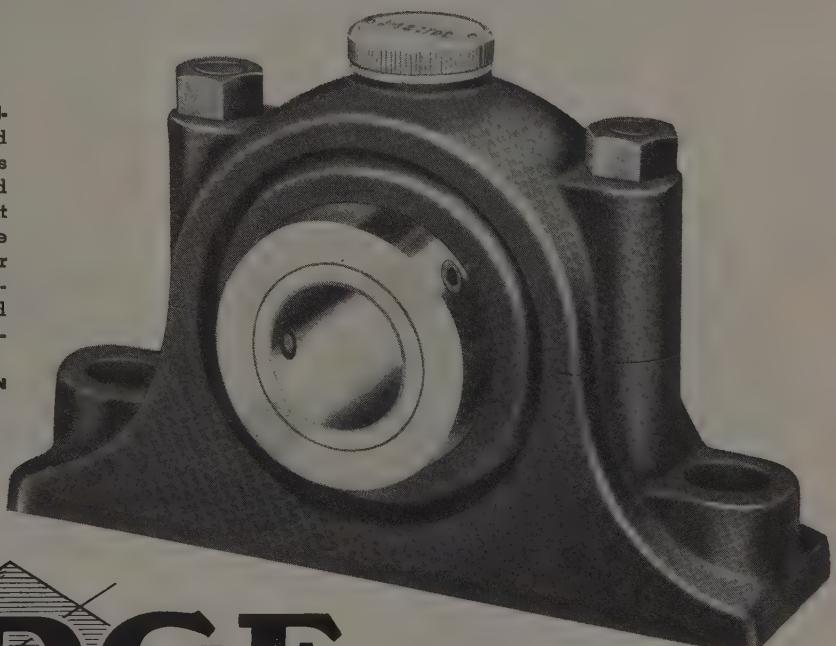
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These Two Names

ON ANTI-FRICTION BEARINGS ARE YOUR
ASSURANCE OF *QUALITY, DEPENDABILITY*
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TO CUT COSTS AND INCREASE PRODUCTION

Dodge-Timken Double Interlock Pillow Block. Dodge mounts, seals and houses the bearing assembly, delivers the pillow block fully assembled ready to lock on the shaft and run at full speed and full load. This is one of the famous Dodge 30,000 hour line, covering a wide range of industrial bearing requirements, and promptly available from Dodge distributors' stocks.

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CALL THE TRANSMISSIONEER
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DIPPED IN MOLTEN ZINC

For the utmost in Rust Prevention



Today, Architects and Builders are relying more and more upon Hot-Dip Galvanizing for the utmost in rust prevention for exposed metal structures.

Hot-Dip Galvanizing is the only process which creates a bond of iron-rich alloy that holds the best possible protective coating of rust-resisting zinc to the base metal.

Hot-Dip Galvanizing has been time-tested under every climatic condition. Records, through the years, definitely prove that while metal is sealed in zinc by the American Hot-Dip Galvanizing method it cannot rust.

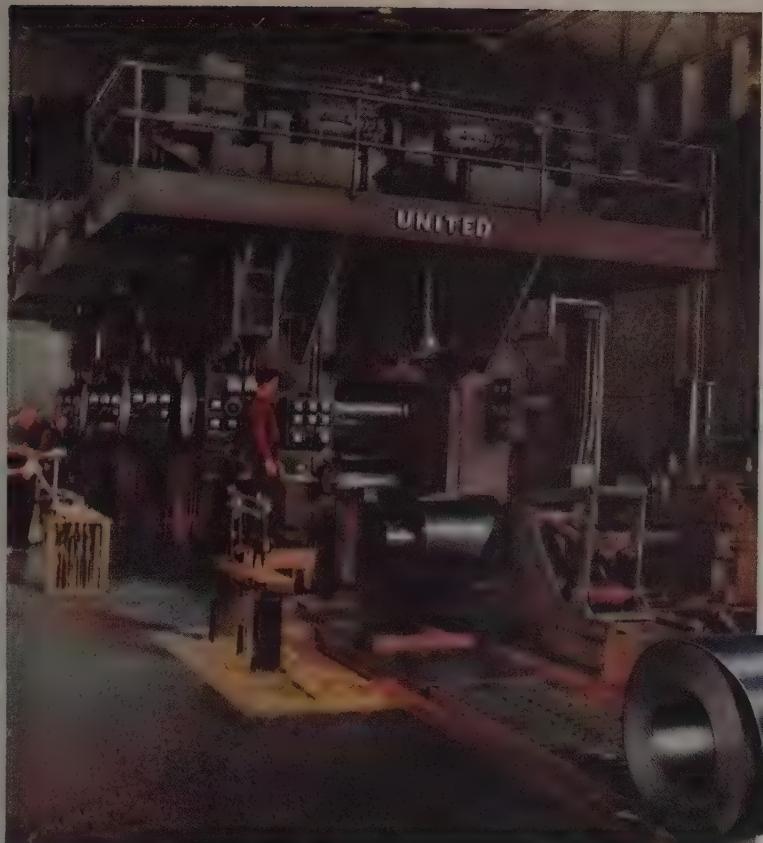
**SEALS IN THE METAL.
SEALS OUT THE ELEMENTS
OF RUST AND CORROSION**

Hot-Dip Galvanizing is your best insurance against rust and corrosion. In giving added life to property, in saving expensive maintenance and replacement costs, Hot-Dip Galvanizing is an investment that does pay dividends.

Concerning your problems of rust and corrosion write American Hot Dip Galvanizers Association, Inc., First National Bank Bldg., Pittsburgh 22, Pa.

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use hot-dip GALVANIZING



UNITED

4-STAND TINPLATE MILL



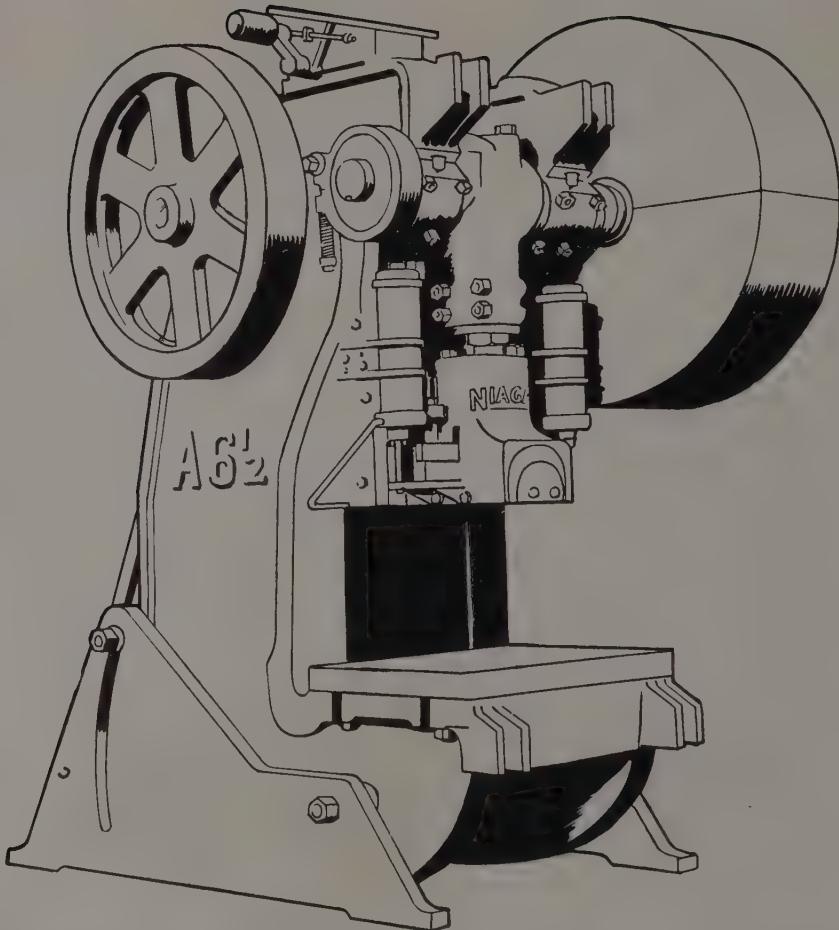
The canning industry—America's largest user of tinplate—depends largely upon progress in the development of new and better steel rolling and coating processes to broaden its ever growing usefulness to the public.

One step in the process of making better tinplate for canning is the giant new United mill shown in operation. Designs for this, and other mills with production speeds up to 5000 feet per minute, are available for duplication, or for revision to suit your requirements. UNITED's engineers will be glad to confer with you concerning your plans for increased tinplate production.



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A PROTECTIVE FINISH FOR
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THE WELDING OF
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Time for a

Spring Check-up...



SAVINGS
BONDS



on the plan that delivers Peace of Mind

THANKS to the work of patriotic volunteers, the U. S. Savings Bonds program has carried America a long way up the road to economic security.

During 1946, in spite of all the problems and uncertainties the nation faced, sales of Savings Bonds exceeded redemptions by \$1,389,216,000. The success of this great sales operation has helped stem the tide of inflation, has reduced public debt holdings of the banking system, and has given millions of citizens a stake in their country and a profitable investment in their own futures.

Yes, we've come a long way—but the trip isn't over! Now is the time to check up on your Payroll Savings Plan. Make sure that all your new employees are familiar with its advantages. Remind *all* your employees that there's no easier, surer way to build their own futures—and America's—than by buying Bonds regularly through the Payroll Savings Plan. Every \$3 invested pays \$4 at maturity!

For any help you need in conducting the Payroll Plan, call on your State Director of the Treasury Department's Savings Bonds Division.

*New Savings Bonds Plan
won't affect the P.S.P.*

SOON the Treasury Department and the banks of America will make it possible for farmers, doctors, and other self-employed people to participate in "automatic" Bond buying by special arrangement with their banks. This extension of the Savings Bonds program is not a partial payment plan and is intended *only* for people who are not in a position to take advantage of the Payroll Savings Plan.

The Treasury Department acknowledges with appreciation the publication of this message by

S T E E L



This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

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STAINLESS STEEL
fastenings



A Flat Head Machine Screw of **STAINLESS STEEL**

And it's just one of the more than 100 items, 7,000 sizes, which we carry in stock, ready to ship, in all standard analyses. STAINLESS STEEL FASTENINGS can save you money, and we're pioneers in their production, with twenty years of manufacturing experience. Machine and wood screws, bolts, nuts, cotter pins, rivets, nails, pipe and pipe fittings—all ready for shipment. Special sizes and analyses manufactured promptly to your specifications. Write for our catalog and stock list. Address Anti-Corrosive Metal Products Co., Inc., 64 River Road, Castleton-on-Hudson, N. Y.

Anti-Corrosive Metal Products Co. Inc.
CASTLETON-ON-HUDSON NEW YORK

TAPPING PRODUCTION

Increased 400%

WITH STANDARD
WALKER-TURNER

15" DRILL HEADS

This set-up for tapping, a design by Pond Engineering Co., Springfield, Mass., and using standard Walker-Turner 15" Drill Heads showed "better than a 400% increase in production over conventional methods."

Two pieces are handled simultaneously, one having three holes to be tapped, the other two. The operator places the pieces on the conveyer plates. The Pond Conveyer and the Walker-Turner Drill Presses do the rest automatically, and finished pieces drip into containers at the other end.

Walker-Turner Heads were chosen for this set-up because the Pond engineers wanted a light-weight, compact unit with extreme flexibility as to mounting, speeds and control. The unique design, rugged construction and low investment cost were other factors in the decision.

TWENTY-FIFTH YEAR

1922

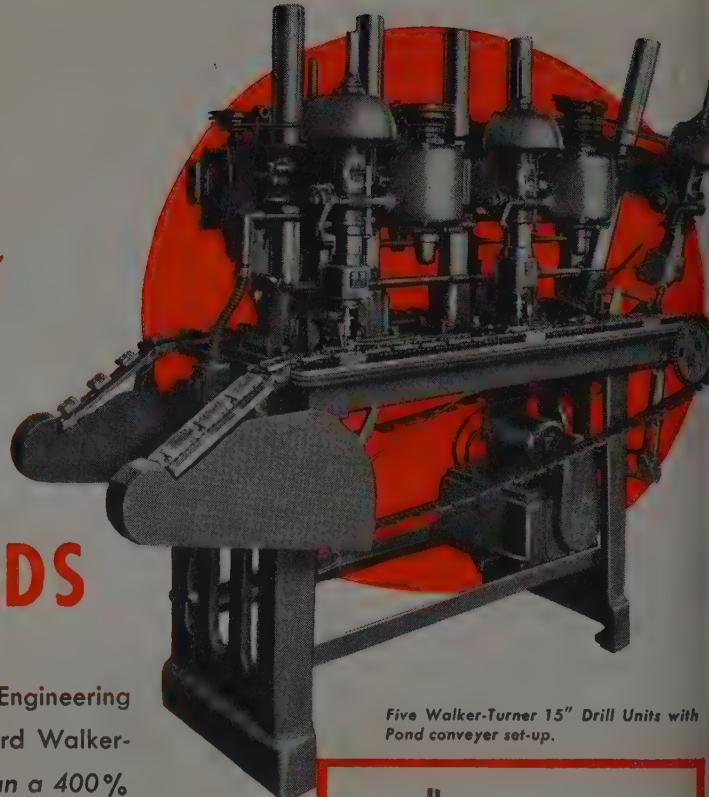
1947

*F.O.B. Plainfield—

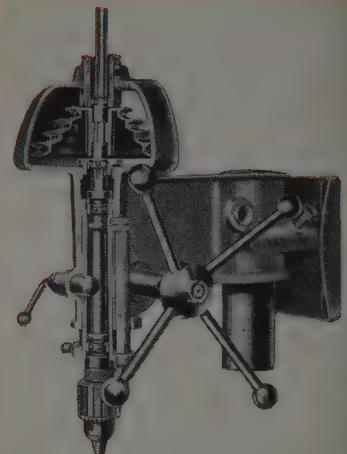
Slightly higher west of the Rockies and in Canada

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163



Five Walker-Turner 15" Drill Units with Pond conveyor set-up.



No. 9D13X, 15" DRILL HEAD

6 spline spindle, 4 bearing, 4 1/4" spindle travel, speeds with 1740 r.p.m. motor 600 to 5000 r.p.m.

*Price less motor and column \$42.50



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RADIAL CUT OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS



Unique RED LEAD "Soaps" ... check Rusting 3 Ways

Scientific research shows why Red Lead has long been regarded as the "standard" metal-protective paint.

One interesting factor is Red Lead's ability to react with the vehicle and produce unique lead "soaps."

These "soap" formations grow to form a tough, impervious, intermeshing matrix thin the paint film, as shown in the photomicrographs below. These "soaps" help Red Lead inhibit rust three ways.

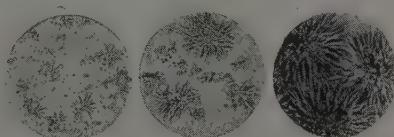
Toughen Paint Film. Radiating from central cores the "soap" formations develop long, hair-like projections, which spread out and interlock. Thus, they form a dense intermeshing structure that *mechanically* reinforces and toughens the paint film.

Make Film Water-Resistant. The very structural formation of these "soaps," with their thick, impervious matrix of closely-set fibres, helps restrict the passage of moisture through the paint film. And metal cannot rust without the presence of moisture.

Keep Film Flexible. The "soap" formations, from being rigid, allow movement all

along their soft, intertwining projections. The resulting flexibility helps prevent the ruptures to which a hard, unyielding paint film is subject. Thus the lead "soaps" aid in maintaining the continuity of the paint film.

Lead "soaps" form primarily in the dry paint film as it ages. This is where the "soap" formations impart their greatest benefits. When a paint film weathers and ages, decomposition products of the vehicle are formed. Red Lead's ability to slowly combine with these decomposition products actually enhances the life of the paint film. Red Lead's slow rate of reaction means the film age-hardens at a slower rate. It thus retains a high degree of flexibility, a great factor in its lasting adhesion.



The photomicrographs above show how Red Lead "soaps" progressively spread out as they grow and thus reinforce the paint film.

Remember, too, Red Lead is compatible with practically all vehicles commonly used in metal protective paints, including fast-drying resin types.

Specify RED LEAD for ALL Metal Protective Paints

The rust-resistant properties of Red Lead are so pronounced that it improves *any* metal protective paint. So, no matter what price you pay, you'll get a better paint if it contains Red Lead.

* * *

The benefit of our extensive experience with metal protective paints for both underwater and atmospheric use is available through our technical staff.

NATIONAL LEAD COMPANY: New York 6; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; St. Louis 1; San Francisco 7; Boston 6, (National Lead Co. of Mass.); Philadelphia 7, (John T. Lewis & Bros., Co.); Pittsburgh 30, (National Lead Co. of Pa.); Charleston 25, W. Va., (Evans Lead Division).

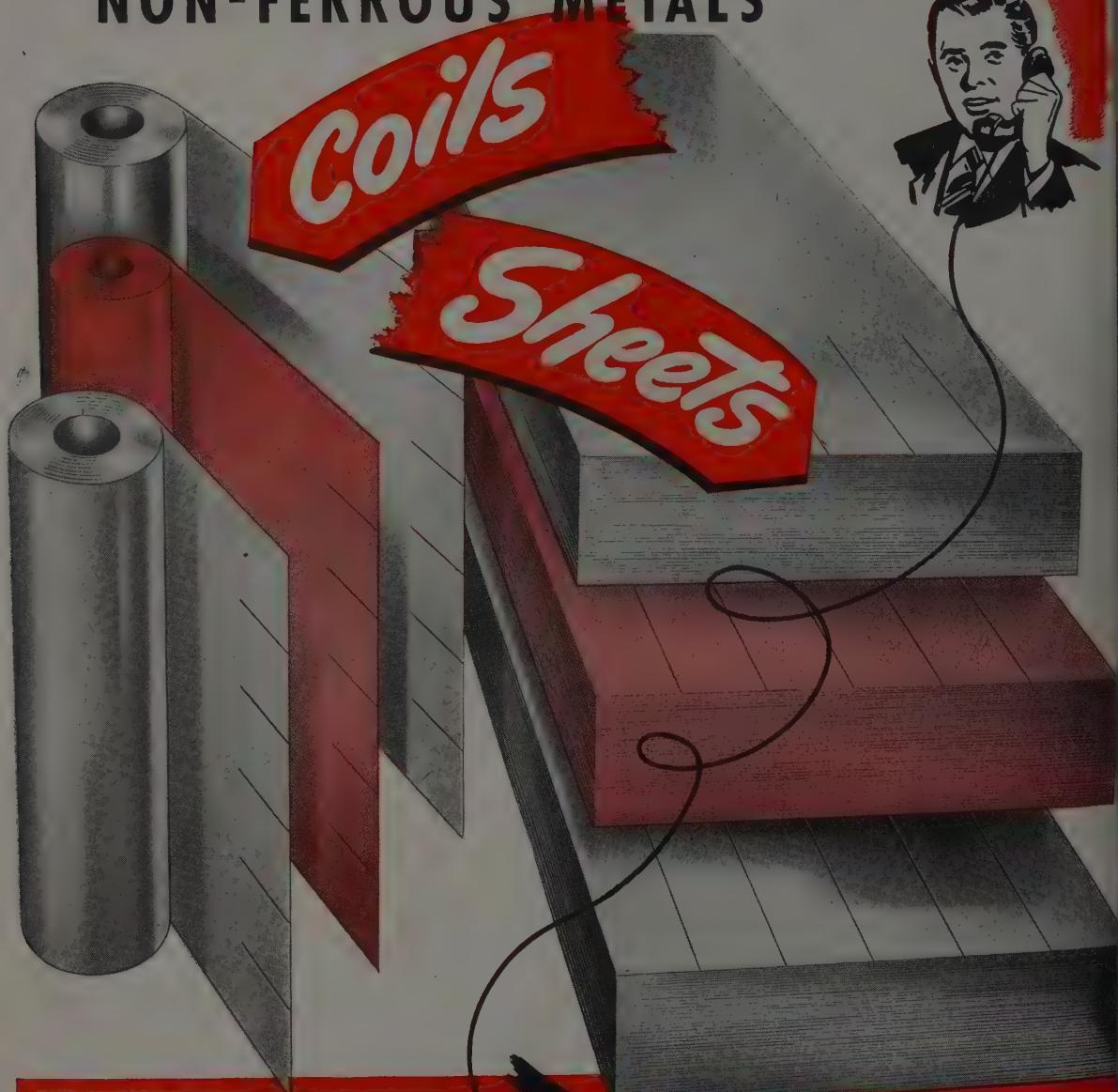


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RED LEAD**

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**FOR FERROUS AND
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UNITED TUBE CORPORATION has available capacity for slitting Ferrous or Non-Ferrous coils or sheets up to 36" wide in any thickness up to 5/32".

If you require precision slitting and quick delivery . . .

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EASY on both hand and eye



As you reduce operator exertion you increase machine output.

Controls concentrated on the heads of Cincinnati Bickford Super Service Radial Drills are exceedingly "handy" and are easy to manipulate.

The design of the head gives the operator a clear, unobstructed view of the work while standing in a comfortable, normal position—no stopping or twisting for a better view.

These powerful, accurate machines are easy on the hand and eye.

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*Equal Efficiency of Every Unit
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THE CINCINNATI BICKFORD TOOL CO. Cincinnati 9, Ohio U.S.A.

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SYSTEMS

for ENAMEL • LACQUER • PAINT

In installations of this type, the Cars, Coaches, Buses, or Trailers Move Through the Hydro-Filter Spray Booth into the Dry-Off Oven on the Same Line. If Floor Space is not Available, These Systems May be Built Outside of Existing Buildings and Completely Housed-in by Mahon.

BOX CARS
COACHES
STREET CARS
BUSES
TRUCK BODIES
TRAILERS

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"You'll Find Mahon Finishing

major production operation, have been employed in this development, and have been engineered into a highly efficient Finishing System to handle products of railroad proportions. Mahon engineers will be glad of an opportunity to study and discuss your spray painting or finishing equipment problems. Call on them any time—they bring to you a wealth of technical knowledge and practical know how not available to you elsewhere. See Mahon Insert in Sweet's Mechanical Industries File Systems All Over the World"

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Business Staff on Page 4

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STEEL

The Magazine of Metalworking and Metalproducing

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APRIL 28, 1947

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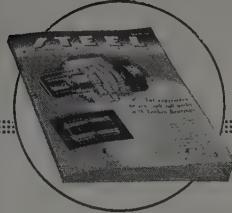
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AS THE EDITOR VIEWS THE NEWS

April 28, 1947

Progress in Bargaining

By virtue of agreements reached by electrical workers with General Motors and Westinghouse and by the steelworkers' union with five subsidiaries of United States Steel the prospect for uninterrupted operations in large segments of American industry has brightened considerably.

Equally as important as the ability of both sides to iron out their difficulties without resorting to strikes is the evidence that they entered into negotiations this year with a greater sense of responsibility and in a more conciliatory attitude than on previous occasions. This may be due in part to a realization that the public is getting tired of labor trouble, to the desire of union leaders to be on good behavior while Congress is considering corrective labor legislation, to lessons learned from past experience or to other causes. Whatever the reasons, some of this year's contracts reflect noteworthy progress in collective bargaining.

For instance, nobody can read the full text of the agreement between Carnegie-Illinois Steel Corp. and United Steelworkers of America (CIO) without realizing that many persons worked hard and long to find a basis of accord between employer and employee. The 18 sections of this document cover in great detail every conceivable factor that enters into labor relations. It is specific as to responsibilities of both parties, procedure for handling grievances, rates of pay, hours of work, working conditions, vacations, severance allowances, overtime, seniority, incentives and many other issues.

Special significance attaches to the first and last sections of the agreement. In Section I, "Purpose and Intent of the Parties", it is stated that "the company and the union encourage the highest possible degree of friendly, co-operative relationships between their respective representatives at all levels and with and between all employees." Also provision is made for quarterly meetings to check on how the agreement is functioning. If the words and spirit of this section can be translated into deeds, miracles in labor relations will be achieved.

Section XVIII, "Termination Date," provides that the agreement shall continue in effect until midnight Apr. 30, 1949, with a proviso that either party can give notice of desire to change rates of pay on Apr. 1, 1948. This departure from the practice of limiting contracts to a period of one year is a long step in the right direction.

Improvements in currently-negotiated contracts reflect credit upon employer and union representatives who for the first time are working without benefit or curse of governmental intervention. They spell encouraging progress in labor relations.

* * *

THREE PRICE METHODS: Right now the nation is witnessing a novel spectacle of price cutting. At least three separate and distinct price-reducing operations are at work.

One is the voluntary mark-down in prices by manufacturers of nationally consumed products. Illustrations are the recent reductions by Ford Motor Co., International Harvester Co., Lever Bros. Co., Colgate-Palmolive-Peet Co., General Cable Co. and others.

The second movement is that apparently initiated

by the merchants of Newburyport, Mass., whereby retailers in a community reduce prices voluntarily and hope that wholesalers and manufacturers will absorb part of the cut. At this writing, this idea seems to be gaining some headway in a number of cities in widely scattered states.

A third and more orthodox example of price reduction is furnished by the present situation in steel-making scrap. Last week heavy melting steel at Pittsburgh declined \$3 per ton. Sizable tonnage offered at \$32 to \$32.50 now is going begging,

(OVER)

AS THE EDITOR VIEWS THE NEWS

whereas a few weeks ago the market was supporting a price of \$38.

The first two methods of reducing prices are expedients launched voluntarily, largely in the hope that their psychological effect would help reverse the upward trend of most commodity prices. The third example illustrates the age-old law of supply and demand. In the final analysis, it is certain to be the more effective of the three. —p. 155

* * *

HIGH PROFITS NEEDED: Numerous annual reports of industrial corporations are bringing to light the discrepancy between the amount of money in depreciation accounts and the actual cost of replacements under present conditions. In several of the reports of automobile companies it was apparent that the current cost of equipment replacements was exceeding depreciation funds by substantial margins.

Frank Purnell, president of Youngstown Sheet & Tube Co., now raises this point as an argument for higher profits. "For years depreciation was calculated as nearly sufficient to pay for replacements," he said. "Costs of construction and of new equipment have increased to a point where reserves built up by depreciation will cover only a portion of the cost of replacement—in fact, as to many units the reserve is less than one-fourth of the replacement costs."

This problem is common to many companies—large and small—and its solution may call for temporary departures from normal fiscal policy. —p. 75

* * *

ERASING WAR SCARS: H. E. Beyster Corp., industrial consultants, Detroit, has prepared an estimate of materials, equipment and supplies needed for a two-year industrialization program for the Philippine Islands. A fair tonnage of a wide variety of iron and steel products will be required. This is for a strictly Philippine program to be financed by the government of the islands and by private interests. It is separate and distinct from the United States government program which calls for an initial expenditure of \$120 million for repairing war-damaged public works in the islands.

The Beyster program is interesting in that it is a forerunner of numerous independent moves by local authorities to rebuild war-destroyed facilities in many parts of the world. As time goes on, more and more of the burden of reconstruction will be handled through private account. In the long run this type of rebuilding may prove to be more important than the initial government-sponsored programs.

—p. 78

SIGNS OF THE TIMES: Of the six major industrial enterprises in Texas City, the styrene plant of Monsanto Chemical Co. was the only one extremely hard hit by the holocaust of April 16. Escaping with little or no damage (p. 71) were the refineries of Pan American and Republic Oil, the plant of Carbide & Carbon Chemical Corp., the crane facilities of Seatrain Lines, Inc. and the tin smelter of Tin Processing Corp.—the only tin smelter in the Western Hemisphere. . . . Washington Steel Corp. is in production on stainless steel strip and sheets up to 36 in. wide and in gages from 0.004 to 0.078. Operations center around a 37 in. wide Sendzimir precision cold mill (p. 118) and a 2-high mill for light skin passes. . . . Prohibitive building costs have replaced shortages of labor and materials (p. 81) as the principal factor retarding plant construction and expansion on the West Coast.

. . . Latest contract of United States Steel Corp. subsidiaries with the steelworkers union places minimum or common labor rates at \$1.09 per hour. This is an increase of 445 per cent over the rate of 20 cents per hour prevailing in 1915. By comparison (p. 68), steel bars which were priced at 1.74c in 1915 now are quoted at 2.65c—an increase of only 52.3 per cent. . . . A novel process of electro-plating has been developed in which the plating current is reversed briefly at short intervals. Advantages (p. 100) include faster plating, removal of unsound metal, heavier deposits of greater density, plate smoother than the base metal and brighter surfaces . . . Wholesale price index of the United States Bureau of Labor Statistics for the week ended Apr. 12 declined to 148.1 from 148.8 in the week ended Apr. 5. This is the second consecutive week of declines (p. 88) from the postwar high of 149.4 recorded in the week ended Mar. 29. . . . Emphasis at the annual Machine Tool Electrification Forum in Buffalo last week (p. 73) centered upon the major role which electrical drive and control elements will play in the new machine tools which will be exhibited at the National Machine Tool Builders' Association show in Chicago in September. It was pointed out that efficient drives and controls constitute one answer to the demand for more production at lower cost . . . Baiting of business, which featured sessions of the 73rd through the 79th Congresses (p. 76), is conspicuously absent in activities of the 80th Congress.

E. L. Shaver

EDITOR-IN-CHIEF



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Outlook for continued high production of steel has been brightened by new wage agreements in the basic steel industry

Vage Settlements Brighten Outlook

Agreements promise year of sustained high production, narrowing of gap between supply and demand, increase in worker efficiency. Steelmakers hope to hold prices unchanged despite sharp increase in labor costs

ACE agreements recently concluded under negotiation in the steel, rubber, rical, automotive and other metalizing industries are expected to calm management seas and assure a sustained high level of production for at a year.

such a prolonged period of uninterrupted production should narrow and finally bridge the gap between supply and demand for materials and products make for greater worker efficiency, contribute substantially to economicity.

some industries, particularly steel and rubber, management is counting on continued high operations and used efficiency to absorb the higher entailed in the wage settlements, generally call for increases aggregating around 15 cent an hour. In other tries, management believes that cost of such wage increases will

necessitate upward adjustments in prices. A few companies have announced they will meet the higher wage pattern and at the same time have announced reductions in the price of their products.

The steel wage settlement dealt a blow to hopes for an early reduction in steel prices, by advancing costs by an average of about \$3.25 per ton of finished steel. This estimate is derived from the fact that 1,082,250,000 man-hours were required in 1946 to produce 53,073,421 tons of finished steel, or an average of 20.42 man-hours per ton. The wage settlement announced by United States Steel Corp. figures out to about 16 cents an hour, indicating the increased cost per ton would be slightly more than \$3.25 for direct labor costs.

The settlement reached by U. S. Steel and the United Steelworkers of America Apr. 20 provides for a general wage increase of 12½ cents an hour and certain

other adjustments in the elimination of inequities, changes in geographical differentials, provision for severance pay and vacation plans, which will amount to an average of about 3½ cents an hour, bringing the total wage advance to 16 cents. U. S. Steel also agreed to participate in the establishment of a new plan involving life, accident, health, medical and hospital insurance, which is to be made the subject of a joint study by the corporation and the union.

Essentially the present contract provisions covering maintenance of membership, as originally directed by the War Labor Board, are continued. The union had asked for a union shop provision. The corporation reiterated its opposition to compulsory or restrictive forms of union membership and restated its belief this matter represents a major problem for national policy determination.

On the portal-to-portal pay issue, which had stymied the negotiations for many weeks, the union agreed that U. S. Steel subsidiaries shall not be obligated to pay for travel or walking time or time spent in preparatory and closing activities during the term of the new agree-

ment. Union also agreed to make no new claims or "aid or support" any existing claims or actions against the subsidiaries for portal pay accruing prior to termination of the new agreement.

One of the important adjustments under the settlement is the broadening of the increment between the 30 job classifications from 3½ cents to 4 cents. This gives workers in the highest classification an increase of 27 cents an hour, from \$1.98 to \$2.25, while the lowest classification, the sweepers and janitors, get 12½ cents, from 96½ cents to \$1.09. This change, which was insisted upon by the union, apparently marks a change in CIO policy which formerly has called for flat increases across the board, and gives belated recognition to the spread between the highly skilled and the unskilled worker.

The new contract eliminates the 2½-cent wage differential at the Duluth plant of American Steel & Wire Co. and reduces the geographical differential in the steel operations of the Tennessee Coal, Iron & Railroad Co. at Birmingham, Ala., by 3 cents an hour.

Severance pay of four weeks for persons with 3 years' service up to 8 weeks' pay for 10 years' service is provided where technological change requires abandonment of plants or departments.

Changes in the vacation plan make employees eligible for one and two weeks'

vacation on the anniversary of their first and fifth year of service, with a third week of vacation for employees with 25 years' service.

The guaranteed annual wage, one of the union's foremost demands, was not mentioned in the settlement.

President Benjamin F. Fairless of U. S. Steel estimated the new contract will result directly in an increase of \$75 million in the corporation's employment costs.

"This does not take into consideration large increases which may well follow in the prices of the many millions of dollars worth of goods and services which we purchase from others. Our past experience has been that a substantial increase in the prices of our purchased goods and services inevitably follows a rise in industrial wage levels. It is impossible now to estimate accurately what these additional costs to U. S. Steel will prove to be."

The new agreement runs from Apr. 1, 1947, to May 1, 1949, with the provision that either party may re-open the subject of upward or downward changes in wage rates during a limited period prior to May 1, 1948.

Under the settlement, the average straight-time hourly earnings of corporation steelworkers will be about \$1.47. This represents an increase of 78 per cent over the comparable rate of Janu-

ary, 1941, when straight-time earnings averaged 85 cents.

The corporation announced that equitable adjustments will be made for salaried employees not represented by the union.

"Under this agreement," said Mr. Fairless, "United States Steel incurs heavy increases in its costs. We sincerely hope that with existing high levels of operations, these increased costs can be absorbed within the limits of present prices for our steel products. We must count heavily on the acceptance by our employees of their obligation to help absorb these new costs by increased effort and improved efficiency. The agreement demonstrates our faith in our employees and we are confident that they in turn will demonstrate anew that we can count on them for full and loyal co-operation in enabling United States Steel to meet its large responsibilities."

Negotiations with other basic steel companies were going forward late last week and it generally was expected that the other producers and the union would agree on settlements similar to that of U. S. Steel subsidiaries.

However, the United Steelworkers also has contracts with some 1100 other companies which use steel as a raw material but which do not produce steel themselves. These companies are variously described as non-basic steel companies, fabricators, processors, etc. They employ

Steel Common Labor Rates

Year	Hourly Rate	Per Cent Advance Over 1915
1915	20.0	
Feb. 1, 1916	22.0	10
May 1, 1916	25.0	25
Dec. 15, 1916	27.5	37.5
May 1, 1917	30.0	50
Oct. 1, 1917	33.0	65
Apr. 16, 1918	38.0	90
Aug. 1, 1918	42.0	110
Oct. 1, 1918	46.2	131
Feb. 1, 1920	50.6	153
May 16, 1921	40.5	102.5
July 16, 1921	37.0	85
Aug. 29, 1921	30.0	50
Sept. 1, 1922	36.0	80
Apr. 16, 1923	40.0	100
Aug. 1923	44.0	120
Oct. 1, 1931	39.6	98
May 16, 1932	33.7	68.5
Aug. 19, 1933 (NIRA Code)	40.0	100
Apr. 1, 1934	44.0	120
Nov., 1936	52.5	162
March, 1937	62.5	212.5
April, 1941	72.5	262.5
July, 1942	78.0	290.0
February, 1946	96.5	392.5
April, 1947	109.0	445.0

Steel Wages—1914-47 (Average Hourly)

1914 (July)	26.3
1920	70.8
1921	52.2
1922	50.4
1923	59.6
1924	63.6
1925	63.8
1926	63.6
1927	64.4
1928	64.7
1929	65.4
1930	66.1
1931	63.6
1932	53.1
1933	52.4
1934	62.8
1935	65.5
1936	66.8
1937	81.8
1938	83.0
1939	84.2
1940	85.0
1941	95.9
1942	105.6
1943	113.5
1944	121.9
1945	124.8
1946	134.7
1947	147.0

WAGES—and How They Grew

MINIMUM or common labor rates in the steel industry have advanced 445 per cent since 1915, from 20 cents an hour to \$1.09. Average hourly earnings have advanced proportionately, from 26.3 cents in 1914 to approximately \$1.47 at present.

Steel prices have advanced relatively less. For example, steel plates were quoted at 1.74c, Pittsburgh, in December, 1915, against today's quotation of 2.65c. Steel bars were 1.74c, against 2.60c at present. Wire nails were \$1.98, against \$4.125. Tin plate was \$3.60, against \$5.75.

Accompanying tables show history of common labor rates, average hourly earnings and a comparison of the movement of average steel wages and finished steel prices since 1938.

	Average Hourly Steel Wage	Per Cent Increase over 1938	Composite Finished Steel Price	Per Cent Change from 1938
1938	83.0	...	\$62.18	...
1939	84.2	1.4	56.73	-8.7
1940	85.0	2.5	56.73	-8.7
1941	95.9	15.5	56.73	-8.7
1942	105.6	22.3	56.73	-8.7
1943	113.5	36.7	56.73	-8.7
1944	121.9	46.9	56.73	-8.7
1945	124.8	50.4	56.73	-8.7
1946	134.7	62.3	58.27	-6.2
1947	147.0	77.1	69.82	+10.6

about 350,000 workers and produce everything from bedsprings to locomotives. They were not represented in the negotiations between the union and the steel producers and their problems differ greatly from those of the producers. Often, the competitors of these companies have contracts with other unions carrying a lower wage scale; in some cases, competitors are open shop.

A year ago, the United Steelworkers attempted to apply the basic steel settlement in toto to the non-basic steel companies. The nonbasic companies, organized as the Nonbasic Steel Co-ordinating Committee, objected strenuously to the attempt. As a result many of these smaller companies continued struck long after the steel producing mills were reopened.

Again this year the Nonbasic Steel Co-ordinating Committee has served notice on the union that its members do not intend to submit to an agreement negotiated with the basic industry and is insisting that agreements with the steel consuming companies be determined by true collective bargaining at the plant level in which their own individual competitive and local plant problems are considered.

No Formula Yet for Fabricators

Philip Murray, president of the United Steelworkers, at a press conference following the announcement of the U. S. Steel agreement, said no formula had been worked for the fabricators. He contended the negotiations will be largely on an individual company basis and added that a number already had indicated willingness to accept the basic contract.

This was interpreted as meaning a 12½-cent hourly increase, inasmuch as the nonbasic companies would not have all the "fringe" problems which accounted for a major portion of the additional 8½-cent adjustment granted by U. S. Steel.

Many of the nonbasic steel companies say that any substantial wage increases will necessitate price increases. Acute competitive situations, on the other hand, often make upward price adjustments unfeasible.

It now appears that the working out of wage agreements between the nonbasic steel companies and the union may be the most difficult labor-management job ahead and one which may be accompanied by scattered strikes unless the union really is willing to bargain at the local plant level.

The larger mass production industries appear likely to fall in line with the new wage pattern generally. Westinghouse Electric Corp. has signed with the United Electrical, Radio & Machine Workers on the basis of a 11½-cent

hourly increase and six paid holidays, equivalent to a 15-cent hourly increase. These terms are the same agreed to by General Motors Corp. and the electrical workers earlier.

General Motors last week had made the same offer to the United Automobile Workers. Although the auto workers were jockeying for possible further advantages, it was considered likely that eventually the settlement with all major auto builders would be effected along these lines.

If the pattern established in the steel and electrical agreements are followed substantially, some price increases appear inevitable. Westinghouse in a price policy statement following signing of the agreement said "some apparatus will require some price increase" due to the higher wages. No price advance on home appliances is contemplated at this time, the company said.

Despite uncertainty regarding manufacturing costs under the new agreement, the company said it is "preparing to quote firm prices on all products where short delivery reduces the hazard."

B. E. Clark, Westinghouse vice president in charge of sales, pointed out that Westinghouse prices at today's level have gone up an average of only 24.5 per cent since 1939, while the index of all wholesale prices (excluding farm products) has gone up 56.6 per cent. The

wage and salary level was up 64 per cent, even before the latest increase.

Industry generally welcomed the new wage agreements, while admitting the higher wage levels will pose a difficult pricing problem for many companies. In the first place, the agreements were reached without costly work stoppages such as disrupted production in 1946. Second, the agreements were worked out by true collective bargaining, without government direction and particularly without the intervention of "fact-finding" boards to tell industry how much of an increase should be granted. Third, conclusion of the agreement finds the workers in a more co-operative attitude than in most previous years; they have received a substantial wage increase without loss of wage due to strikes and without the bitterness often generated by work stoppages.

In the negotiations, industry apparently has won two important points: 1. Portal pay issue was thrown out the window; 2. the union made no fight for a guaranteed annual wage at this time.

In a telegram to STEEL, the office of Secretary of Labor Lewis B. Schwellenbach said the negotiations "indicate growing acceptance of joint responsibility by industry and labor. Coupled with a judicious price policy, this could launch an extended period of high production and economic stability."

Provisions of New U. S. Steel Labor Agreement Summarized

AMONG provisions of the new agreement between Carnegie-Illinois Steel Corp. and the United Steelworkers of America-CIO are the following:

Section 1—Purpose and Intent

The purpose of the company and the union in entering into this labor contract is to set forth their agreement on rates of pay, hours of work and other conditions of employment so as to promote orderly and peaceful relations with the employees, to achieve uninterrupted operations in the plants and to achieve the highest level of employee performance consistent with safety, good health and sustained effort.

The company and the union encourage the highest possible degree of friendly, co-operative relationships between their respective representatives at all levels and with and between all employees. The officers of the company and the union realize that this goal depends on more than the words in the labor agreement, that it depends primarily on attitudes between people in their respective organizations and at all levels of responsibility. They believe that

proper attitudes must be based on full understanding of and regard for the respective rights and responsibilities of both company and union. They believe also that proper attitudes are of major importance in the local plant where day-to-day operations and the administration of the labor agreement demand fairness and understanding. They believe that these attitudes can be encouraged best when it is made clear that company and union officials, whose duties involved negotiation of this labor agreement, are not antiunion or anticorporate but are sincerely concerned with the best interests and well-being of the business and all employees.

Accordingly, the company and the union, as evidence of attitude and intent, have agreed that during the life of this agreement officials of their respective organizations shall meet on the third Tuesday of each third month from date of this agreement in the city of Pittsburgh. The purpose of such meetings is understood to be an appraisal of the problems, if any, which have arisen in the application, administration and interpretation of this agreement and which may be interfering with the attainment

of their joint objective as set forth above. Such meetings shall not be for the purpose of conducting continuing collective-bargaining negotiations, nor to in any way modify, add to, or detract from the provisions of this agreement.

By such an arrangement the parties are affording concrete evidence of a sincere attempt to accomplish the goal of co-operative good industrial relations and of their purpose to find ways to overcome difficulties or influences interfering with the attainment of their goal.

By such arrangement the parties believe that they, as men of good will with sound purpose, may best protect private enterprise and its efficiency in the interests of all, as well as the legitimate interest of their respective organizations within the framework of a democratic society in which regard for fact and fairness is essential.

Section 2—Scope of Agreement

Defines employees covered by agreement and local working conditions.

Section 3—Management

The company retains the exclusive rights to manage the business and plants and to direct the working forces. The company in the exercise of its rights, shall observe the provisions of this agreement.

The rights to manage the business and plants and to direct the working forces include the right to hire, suspend or discharge for proper cause, or transfer, and the right to relieve employees from duty because of lack of work or for other legitimate reasons.

Section 4—Responsibilities of the Parties

Each of the parties agrees to observe provisions of the agreement. In addition to other provisions, the following shall be observed:

1. There shall be no intimidation or coercion of employees into joining the union or continuing their membership therein.

2. There shall be no union activity on company time.

3. There shall be no strikes, work stoppages or interruption or impeding of work. No officer or representative of the union shall authorize, instigate, aid or condone any such activities. No employee shall participate in any such activities.

4. The applicable procedures of this agreement will be followed for the settlement of all grievances.

5. There shall be no interference with the right of employees to become or continue members of the union.

6. There shall be no discrimination, restraint or coercion against any employee because of membership in the union.

7. There shall be no lockouts.

8. All grievances shall be considered carefully and processed promptly in accordance with the applicable procedures

of this agreement.

The right of the company to discipline an employee for a violation of this agreement shall be limited to the failure of such employee to discharge his responsibilities as an employee and may not in any way be based upon the failure of such employee to discharge his responsibilities as a representative or officer of the union. The union has the exclusive right to discipline its officers and representatives. The company has the exclusive right to discipline its officers, representatives and employees.

Section 5—Maintenance of Membership and Checkoff

All employees who, 15 days after Apr. 23, 1947, are members of the union in

COPIES AVAILABLE

Complete copies of the new labor agreement between United States Steel Corp. steelmaking subsidiaries and the United Steelworkers of America-CIO are available on request to the United States Steel Corp., Pittsburgh.

good standing and all who become members after that date shall, as a condition of employment, maintain their membership in good standing for the duration of the agreement.

Company, for said employees, shall deduct from the first pay of each month the union dues (not to exceed \$2) for the preceding month. The initiation fee (not to exceed \$3) and assessments (not to exceed \$2 a year) as designated by the union shall be deducted in the same manner.

Section 6—Adjustment of Grievances

General grievance procedure follows pattern of previous contracts although some important changes designed to expedite handling of those grievances involving more than one employee, or a whole department, through the first two steps, are included. Beyond the third step, the time has been lengthened to permit more judicious consideration of the case by the international union officials.

Numerous other refinements in grievance procedure are incorporated and reflect the experience of the union and the company in handling such matters under previous contracts.

Section 7—Arbitration

Board of Conciliation and Arbitration established in 1945 is re-established in the new agreement, with authority to interpret, apply and determine compliance with the provisions of the contract and such local working conditions as

may be in effect, as shall be necessary to the determination of grievances appealed to the board.

If the agreement is violated by a strike, the board shall refuse to consider any cases of employees involved while strike is in effect.

Section 8—Suspension and Discharge Cases

Initial disciplinary suspension shall be for not more than 5 days. If employee believes he was dealt with unfairly, grievance procedures are set up for hearing and further consideration of case.

Section 9—Rates of Pay

Standard hourly wage scales under 30 job classifications are established in the agreement. These range from \$1.09 for class 0-1 workers, sweepers, janitors, etc., to \$2.25 for class 30 workers. This represents an increase of 12½ cents an hour for the lowest paid workers.

The increment between the various job classifications has been increased from 3½ cents to 4 cents, resulting in larger increases being granted to the more skilled jobs.

When new incentives are developed by the management, they shall be submitted to union representatives with explanations and reasonable opportunity afforded union representatives to be heard with regard to the proposed incentive. If union representatives are not satisfied, the proposal may be subjected to grievance procedure.

The joint wage rate inequity negotiating committee, representing the company and the union, shall continue its program of eliminating wage inequities under the program of May 8, 1946.

Shift differentials of 4 cents an hour for the afternoon shift and 6 cents an hour for the night shift are retained.

Section 10—Hours of Work

Normal hours of work are defined as 8 hours in any 24, and the normal work pattern as 5 consecutive workdays beginning on the first of any 7-consecutive day period. Employees shall be scheduled on the basis of the normal work pattern except where: a. Such schedules regularly would require the payment of overtime; b. deviations from the normal work pattern are necessary because of breakdowns or other matters beyond the control of management; c. schedules deviating from the normal work pattern are established by agreement between plant management and the grievance committee.

Employees scheduled or notified to report for work shall be provided a minimum of 4 hours of work or pay for 4 hours' work.

Section 11—Overtime

Overtime at time and a half shall

be paid for hours in excess of 8 in a workday, or in excess of 40 in a payroll week, or on the sixth or seventh day of a payroll week in which work was performed for the first five days, and on six designated holidays.

Section 12—Vacations

Employees with one year of service shall receive one week of vacation; employees with 5 years' service shall receive two weeks of vacation; and employees with 25 years' service shall receive three weeks of vacation.

Employees granted vacations will be paid at the average rate of earnings for the first two of the last three closed and calculated pay periods worked by the employee preceding the first week of the actual vacation period. Hours of vacation pay shall be the average hours per week worked in the first two of the last three closed and calculated pay periods before the vacation starts, but shall be not less than 40 hours per week or the scheduled workweek of the plant, whichever is larger, nor more than 48 hours per week of the scheduled work-week, whichever is larger.

If in the opinion of management, the vacation program would interfere with maximum production, employees eligible for two weeks or more vacation may be granted a vacation allowance in lieu of one week of vacation.

A period of temporary shutdown in any department for any reason between June 1 and Oct. 1, unless other periods are mutually agreed upon, may be designated as the vacation period for employees of that department.

Section 13—Seniority

Seniority status shall be determined by three factors: a. Ability to perform the work; b. physical fitness; c. continuous service. Only where factors a and b are relatively equal shall length of service be the determining factor.

Seniority in the case of interplant transfers shall be adjusted between local plant management and the local grievance committee.

A joint committee of management and the union will be designated within the next 60 days to study seniority practices in effect.

Section 14—Safety and Health

Company and the union will cooperate in the continuing objective to eliminate accidents and health hazards. Company shall continue to make reasonable provisions for the safety and health of its employees at the plants.

Protective devices, wearing apparel and other equipment necessary properly to protect employees from injury shall be provided by the company in accordance with practices now prevailing or as such practices may be improved from time to time. Goggles, gas masks, face

shields, respirators, special purpose gloves, fire-proof, water-proof or acid-proof protective clothing when necessary and required shall be provided by the company.

If employees believe they are required to work under unsafe or unhealthful conditions they may either file a grievance in the third step of the grievance procedure to obtain relief from the job or jobs and be assigned to other work.

Section 16—Severance Allowance

When the company closes a plant or department, eligible employees shall receive a severance allowance. Employees with 3 years' continuous service shall receive 4 weeks' allowance; 5 years' service, 6 weeks' allowance; 7 years' service, 7 weeks' allowance; 10 years or more, 8 weeks' allowance. Allowance shall be calculated in same manner as vacation allowances and paid in a lump sum.

Section 18—Termination Date

Terms and conditions of agreement shall continue in effect until midnight, Apr. 30, 1949, provided that either

party may on Apr. 1, 1948, give written notice to the other party of its desire to negotiate a general and uniform change in rates of pay. Within 5 days after the giving of such notice, the parties shall meet for the purpose of negotiating such issue. Failing agreement on such issue on or before Apr. 30, 1948, this agreement shall continue in effect until midnight Apr. 30, 1949.

Forty-five days prior to May 1, 1949, the parties shall meet in Pittsburgh to negotiate a new agreement.

Bethlehem Steel Earns \$16,090,426 in Quarter

Bethlehem Steel Co. earned net profit of \$16,090,426 in quarter ended Mar. 31, equal to \$4.84 per common share. First quarter, 1946, earnings were \$4,804,438, including a credit of \$11,000,000 transferred from contingent reserve on account of extraordinary costs incurred as result of the steel strike. In the last quarter of 1946, company's net was \$11,937,281.

Average ingot production in the first quarter was 98 per cent of capacity.

Present, Past and Pending

■ U. S. RUBBER CO. ANNOUNCES NEW CONVEYOR BELT

NEW YORK—A new conveyor belt of greatly increased strength has been developed by United States Rubber Co. for conveying coal, iron ore and other bulky materials long distances. Key to increased strength is a revolutionary new textile construction of nylon and Ustex yarn, the latter developed by U. S. Rubber Co. textile scientists.

■ MONSANTO CLEARS AWAY PLANT WRECKAGE

ST. LOUIS—Clearing of wreckage and plans for rebuilding of Monsanto Chemical Co.'s styrene plant, practically demolished in the recent Texas City, Tex., blast are under way. Parts of the plant may be back into operation in six months.

■ \$28 MILLION TO BE SPENT FOR MODERNIZATION

MIDDLETOWN, O.—American Rolling Mill Co. will spend \$28 million this year for expansion and modernization.

■ PRICES TO BE CUT BY THOMPSON PRODUCTS

CLEVELAND—Price reductions of as much as 15 per cent will be made in May on some automotive replacement parts produced by Thompson Products Inc.

■ YOUNGSTOWN AREA FURNACES RELIGHTED

YOUNGSTOWN—All of this area's blast furnaces down because of the coal miners' work stoppage are back in blast after relighting of Shenango Furnace Co.'s number 2 furnace at Sharpsville, Pa.

■ APPROVES RETURN OF FINE TO UMW

WASHINGTON—Federal Judge T. Alan Goldsborough said last week he would impose no objection to a government suggestion that the United Mine Workers be given back \$2,800,000 of the fine assessed them in their recent conviction for contempt of court. However, this would not leave the UMW free from court supervision.

Slight Drop in Steel Shipments In February Due to Fewer Days

Daily average movement during month tops that reported for January. Tonnage moved in first two months of year exceeds that in like 1946 period by wide margin. Proportion of hot-rolled sheets and strip to total shipments up slightly

FINISHED steel shipments declined about 8 per cent during February to 4,626,424 net tons compared with 5,062,990 (revised) in January, the American Iron & Steel Institute reported. The decline was due chiefly to the shorter month since shipments on an average daily basis actually were larger, 165,229 tons against 163,322 tons in January.

Total net shipments for the first two months of this year came to 9,689,414 tons, a 102 per cent increase compared with movement of only 4,783,699 tons in the like 1946 period. A year ago shipments were curtailed by the steel strike.

Of the February, 1947, total product movement, sheets and strip accounted for 29 per cent; bars, 18.8 per cent; tubular goods, 9.2 per cent; plates, 9.6 per cent;

wire and wire products, 7.9 per cent; heavy structural shapes, 7.2 per cent; and other products 18.3 per cent.

Net shipments by major classifications during February and January this year were respectively as follows: Semifinished products, 215,814 and 199,974 net tons; hot-rolled sheets, 545,843 and 595,900; cold-rolled sheets, 394,285 and 416,089; galvanized sheets, 114,594 and 139,936; hot-rolled strip, 135,961 and 145,600; cold-rolled strip, 116,258 and 126,003; structural shapes, 333,702 and 361,976; plates, 444,535 and 467,548; hot-rolled bars, 711,378 and 782,209; cold-finished bars, 148,067 and 159,252; tubular goods, 428,477 and 467,322; wire and wire products, 364,069 and 419,618; black, tin and terne plate, 297,090 and 332,275;

wheels and axles, 43,719 and 49,505.

In addition to these shipments, 389,510 of steel products were moved in February and 867,705 tons in the first two months of the year to members of the industry for conversion into further finished products. Bulk of these shipments consisted of ingots, blooms, billets, tube rounds, sheet and tin bars accounting for 140,881 tons in February. Shipments of carbon hot-rolled bar under the conversion category totaled 58,747 tons, and those of hot-rolled sheets 39,819 tons and hot-rolled strip 23,217 tons.

Data for the first two months of this year appear to disprove charges made recently in some consuming circles that a larger proportion of hot-rolled sheets and strip is being diverted to the cold-rolling mills. During the period hot-rolled sheets and strip actually accounted for a larger proportion of total products shipped than was the case in all of 1946. Of the combined January-February total, hot-rolled sheets accounted for 11.8 per cent of the total finished steel movement and hot-rolled strip 2.9 per cent. This compared with 11.3 per cent and 2.8 per cent in all of 1946.

Cold-rolled sheet shipments in the

Steel Products	Number of Companies Reporting	Tons	FEBRUARY - 1947			To Date This Year			Whole Year - 1946		
			Net Shipments (Excluding Shipments to Members of the Industry for Con- version into Further Finished Products or for Resale) (Net Tons)	Shipments to Members of the Industry for Con- version into Further Finished Products or for Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Con- version into Further Finished Products or for Resale) (Net Tons)	Shipments to Members of the Industry for Con- version into Further Finished Products or for Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Con- version into Further Finished Products or for Resale) (Net Tons)	Shipments to Members of the Industry for Con- version into Further Finished Products or for Resale (Net Tons)	Net Shipments (Excluding Shipments to Members of the Industry for Con- version into Further Finished Products or for Resale) (Net Tons)	Shipments to Members of the Industry for Con- version into Further Finished Products or for Resale (Net Tons)	
Ingots, blooms, billets, tube rounds, sheet and tin bars, etc...	39	1	215,814	4.7	140,881	4.3	415,788	4.3	323,263	4.0	1,645,748
Structural shapes (heavy)...	12	2	333,702	7.2	470	*	695,678	7.2	745	7.1	3,747,284
Steel piling	3	3	25,121	0.5	23		54,079	0.5	23	0.4	141
Plates (sheared and universal)...	28	4	444,535	9.6	25,311		912,083	9.4	43,052	8.5	250,709
Skelp...	5	5	12,447	0.3	23,588		26,131	0.3	62,943	0.5	194,666
Rails—Standard (over 60 lbs.)	4	6	175,281	3.8	155		388,581	4.0	155	3.7	4,890
—All other...	5	7	15,226	0.3	2		28,629	0.3	24	0.3	426
Joint bars...	7	8	15,695	0.3	623		30,268	0.3	1,982	0.4	5,327
Tie plates...	8	9	29,487	0.6	560		72,839	0.7	1,375	0.9	18,700
Track spikes	10	13,215	0.3	10		27,497	0.3	10	146,194	0.3	693
Hot Rolled Bars—Carbon	32	11	476,860	10.3	58,747		998,929	10.3	131,150	10.3	707,991
—Reinforcing—New billet...	15	12	98,855	2.1	628		191,963	2.0	1,358	2.1	7,381
—Rerolled...	11	13	7,596	0.2	-		18,580	0.2	141,346	0.3	1,267
—Alloy...	25	14	130,667	2.8	16,460		284,015	2.9	35,206	2.8	138,395
—TOTAL...	15	15	711,378	15.4	75,855		1,493,587	15.4	167,694	15.5	855,034
Cold Finished Bars—Carbon	27	16	127,102	2.7	506		261,822	2.7	929	2.7	2,428
—Alloy...	25	17	20,965	0.5	131		45,497	0.5	249	0.4	1,725
—TOTAL...	33	18	148,067	3.2	637		307,319	3.2	1,178	3.1	4,153
Tool steel bars...	19	19	7,262	0.2	363		15,918	0.2	730	0.2	371
Pipe & Tubes—Butt weld...	14	20	121,044	2.6	4,669		248,158	2.6	9,787	2.6	45,593
—Lap weld...	8	21	32,176	0.7	38		67,645	0.7	222	0.6	238
—Electric weld...	11	22	70,313	1.5	833		134,475	1.4	1,842	1.4	591
—Seamless...	11	23	149,260	3.2	9,000		324,982	3.3	22,608	3.8	83,441
—Conduit...	6	24	9,705	0.2	534		19,488	0.2	1,244	0.2	2,448
—Mechanical and pressure tubing...	12	25	45,979	1.0	1,237		101,051	1.0	2,758	0.9	3,478
Wire rods...	20	26	41,709	0.9	14,430		101,267	1.0	34,707	1.4	346,506
Wire—Drawn...	28	27	197,957	4.3	21,051	*	414,639	4.3	38,162	4.0	135,592
—Nails and staples...	18	28	67,500	1.5	748		144,980	1.5	1,125	1.3	797
—Barbed and twisted...	14	29	17,578	0.4	-		38,075	0.4	-	0.4	-
—Woven wire fence...	12	30	29,703	0.6	344		65,294	0.7	666	0.5	-
—Bale ties...	12	31	9,622	0.2	16		19,432	0.2	31	0.2	-
Black Plate—Ordinary	9	32	64,256	1.4	187		142,639	1.5	613	1.6	3,179
—Chemically treated...	8	33	3,664	0.1	-		9,391	0.1	-	-	-
Tin and Terne Plate—Hot dipped...	9	34	136,466	3.0	-		295,548	3.0	-	1,926,657	3.9
—Electrolytic...	9	35	92,704	2.0	-		181,787	1.9	-	909,173	1.9
Sheets—Hot rolled...	29	36	545,843	11.8	39,819		1,141,743	11.8	92,385	11.3	421,198
—Cold rolled...	17	37	394,285	8.5	1,741		810,374	8.4	2,267	8.4	3,397
—Galvanized...	16	38	114,594	2.5	24		254,530	2.6	44	3.0	1,725
—Electrical and enameling...	10	39	38,734	0.8	48		88,473	0.9	247	0.9	-
Strip—Hot rolled...	22	40	135,961	2.9	23,217		281,561	2.9	50,381	2.8	237,176
—Cold rolled...	33	41	116,258	2.5	3,063	*	242,261	2.5	5,389	2.6	25,904
Wheels (car, rolled steel)...	5	42	29,944	0.7	-		64,185	0.7	-	252,308	0.5
Axes...	5	43	13,775	0.3	53		29,039	0.3	53	0.3	221
All other...	-	44	-	-	-	-	-	-	6,266	-	-
TOTAL STEEL PRODUCTS	141	45	4,626,424	100.0	389,510	*9,689,414	100.0	*867,705	48,775,532	100.0	4,297,889

* Adjusted.

first two months this year accounted for 3.4 per cent of total shipments, the same as in 1946, while cold-rolled strip shipments were 2.5 per cent of total steel movement in January and February compared with 2.6 per cent in all of last year.

Iron and Steel Exports Drop Slightly in February

Exports of semimanufactured iron and steel from the United States were valued at \$28 million in February, the Department of Commerce reported last week. This compared with exports valued at \$30 million in January, and with \$12,000,000 in February, 1946.

Shipments of steel ingots, billets, bars, rods, etc., during the month were valued at \$9,900,000 compared with \$10,700,000 in January and \$4,200,000 in February a year ago. Exports of plates, sheets, etc. were valued at \$11,400,000 against \$9,000,000 the preceding month and \$4,000,000 in February, 1946.

Movement out of the country of tin plate and taggers tin during the month was valued at \$4,200,000 compared with \$6,600,000 in January and \$1,900,000 in February a year ago.

Steel mill manufacturers' shipments were valued at \$24,200,000 against \$27,00,000 in January and \$14,200,000 in February, 1946, while shipments of advanced iron and steel manufactures were valued at \$18,400,000 against \$18,500,000 in January and \$9,700,000 in February year ago.

Iron and steel scrap exports during February were valued at \$100,000 compared with \$200,000 in the preceding month and with \$100,000 in the like month of 1946.

Industrial machinery exports were valued at \$94,200,000 in the month against \$99,000,000 the preceding month, and \$52,200,000 in February a year ago. Metalworking machinery exports in the month were valued at \$14 million compared with \$19,900,000 in January and \$9,600,000 in February, 1946.

Work Progressing on New Bethlehem Pacific Mill

Bethlehem Pacific Coast Steel Corp. as nearly completed pouring of the foundations for its new 32 in. blooming mill and Morgan 2-stand, continuous combination bar and rod mill in the Vernon section of Los Angeles. Equipment will be installed over the next few months. Additional facilities will be built later but these are not included in the present budget. Bethlehem Pacific now operates 3 open hearths and billet and bar mills at this plant.

Machine Tool Electrification Forum Attracts Several Hundred

Sessions at Buffalo devoted to roundup of developments in electrical drive and control as applied to manufacturing equipment. Cost-cutting is theme of meeting. New motor plant of Westinghouse Electric Corp. inspected

By GUY HUBBARD

Machine Tool Editor, STEEL

BUFFALO

MEETING outside the Pittsburgh area for the first time since its institution in 1936, the annual Machine Tool Electrification Forum was held at Hotel Statler and the huge new electric motor plant of the Westinghouse Electric Corp., in Buffalo, Apr. 22 and 23.

About 300 persons, representing all of the major machine tool building companies in the United States and Canada attended, testifying to the high degree of development of electrification of machine tools and other types of metalworking machinery used in mass production operations.

Throughout the program, considerable emphasis was placed upon the major role which electrical drive and control elements will play in the new machine tools which will be displayed in the big Machine Tool Show to be staged by the National Machine Tool Builders' Association in Chicago, Sept. 17-26, 1947.

Must Reduce Costs

Keynote of the existing situation in the manufacturing industries was struck by L. E. Osborne, vice president of Westinghouse, when he said: "The chief problem confronting us today is—how can we expand production and at the same time reduce costs of production. Before the war, our costs were such that we could make a good profit on \$200 million gross annual business. Today, however, our costs of operation are so high that we would lose a lot of money on \$200 million of annual sales. This kind of thing is not simply a Westinghouse problem. It is one found by industry generally."

Other speakers, notably Alexander G. Bryant, the association's first vice president, expanded on the idea of how the new model machine tools such as will be exhibited in Chicago, will go far to solve this nationwide problem, by making more and better things for more people—at lower cost—and at the same time, improving working conditions in industry.

A working example of this kind of thing was given by the inspection of the motor production lines in the Buffalo plant which Westinghouse recently took over from the aviation industry. This

great plant, adjoining the Buffalo airport, eventually will give work to more than 7000, of whom about 3500 already have been hired. It is devoted largely to the mass production of a new line of motors constructed of formed and welded steel. The plant not only has the latest machine tools but also is highly mechanized as far as material handling is concerned. Being mostly on one level, this is possible to a high degree—not only as far as material-in-process is concerned, but also in the handling of scrap and chips.

This plant, and the operations carried out therein, give an effective preview of the new day in manufacturing and the extent to which metal stamping and welding can be tied in with machine tool cutting operations in making better products cheaper.

One of the features of the meeting was the introduction as luncheon speaker of L. D. Bell, president, Bell Aircraft Corp., Buffalo. Mr. Bell, immediately after his successful proxy battle to retain control of his company, received a big ovation. He spoke on the possibilities of supersonic flight and on the place of the helicopter in private and commercial aviation.

Lukens Reports Profit for Half of 1947 Fiscal Year

Consolidated net profits of Lukens Steel Co., Coatesville, Pa., and subsidiaries for the first half of its 1947 fiscal year which ended March 22 totaled \$817,853 after provision for income taxes, Robert W. Wolcott, president, has reported. This compares with consolidated net loss of \$1,021,458 for the first half of the 1946 fiscal year.

Continental Steel Corp. Reports Rise in Net Profit

Continental Steel Corp., Kokomo, Ind., reports first quarter, 1947, net profit of \$393,223, which exceeds that for any quarter of 1946.

In the first quarter of 1946, net profit was only \$10,961. In the final quarter of that year, net profit was \$251,972.

Net sales in the initial quarter of 1947 were \$6,603,159, compared with \$4,342,684 in the first quarter of 1946.

New Tool Shipments, Orders Up

Substantial gains in March mark recovery from winter slump. Cleveland builders center interest around Ferguson requirements

CLEVELAND

RESURGENCE of new machine tool ordering from the somewhat depressed level that prevailed during the winter months is noted by tool builders. Although buying is spotty, builders are maintaining relatively high levels of production, cutting into order backlogs as materials supplies permit.

Figures issued by the National Machine Tool Builders' Association, Cleveland, reveal receipts in March of the largest dollar volume of new firm orders since last October. Ordering last month was approximately 16 per cent above the February figure, which had established a postwar low.

Estimated total industry shipments of new tools in March were \$29,012,000, a figure surpassed in only three months—October, 1945, January, 1946, and October, 1946—since V-J Day. Shipments have been taking a fairly steady gouge out of order backlog since last July, but reported unfilled orders are still more than five times as large as reported shipments.

Further encouraging sign for the tool building industry is the decline in cancellations; in March, 18 per cent fewer cancellations (in dollar volume) were reported than in February.

That foreign demand is a considerable factor in new tool ordering is indicated by the association's figures showing firm orders from abroad constituted 27 per cent of new ordering in March. Thirty per cent of the unfilled order backlog is made up of foreign orders. Dollar volume of foreign shipments last month was exceeded in only two months since the end of the war and represented 29 per cent of reported shipments.

In hold-the-line price actions, possibly stemming from the administration's anti-inflation pleas and possibly from the competitive forces now operating in the industry, tool manufacturers are more widely quoting firm prices and abandoning escalator clauses in tool contracts.

In the Cleveland area, widespread in-



TOOL BUILDERS MEET: Plans for the machine tool exposition to be held in Chicago in September were discussed at the spring meeting of the National Machine Tool Builders' Association in Atlantic City, N. J., Apr. 16. Left to right at the banquet table: A. G. Bryant, vice president, Cleereman Machine Tool Co., Chicago; Dr. Alan Valentine, president, University of Rochester, banquet speaker; Herbert H. Pease, president, New Britain Machine Co., New Britain, Conn.; Lloyd D. McDonald, vice president, Warner & Swasey Co., Cleveland

terest centers around the as yet undisclosed plans by Harry Ferguson Inc. for manufacturing tractors. Type of operations in the company's recently acquired plant in Euclid, O., a Cleveland suburb, has not yet been revealed and tool sellers are on tenterhooks until the company announces its plans. If the company decides to tool up on a large scale, machinery builders will immediately feel pressure for quick delivery of a wide variety of metalworking equipment. If, however, many of the company's tractor components are to be farmed out to contractors, Ferguson's tool buying may largely be

confined to smaller bench tools and some finishing equipment.

Disposal by War Assets Administration of surplus tools has slowed down considerably. Surpluses have, in some ways, turned into a profitable sideline for new tool builders, who are rebuilding WAA tools into equipment with greater ranges of peacetime applications. This rebuilding work and the replacement parts market, although small relative to the overall machinery market, is helping keep tool builders' machinery and personnel productively used and plant operations at high levels.

Broad Technical Program To Feature 2-Day American Iron & Steel Institute Meeting

PLANS are being completed for the 55th general meeting of the American Iron & Steel Institute to be held May 21-22 in New York, sessions being scheduled for the Hotel Pierre and Waldorf-Astoria.

The meeting will open at Hotel Pierre, May 21, with Quincy Bent, vice president, Bethlehem Steel Co., presiding. At this session the first Charles M. Schwab Memorial Lecture will be delivered by Eugené G. Grace, chairman, Bethlehem Steel Co., followed by an address by Wilfred Sykes, president, Inland Steel Co., Chicago.

Four technical programs devoted to timely operating and metallurgical problems will be held in the afternoon at Hotel Pierre at which a total of 23 technical

papers will be presented.

The raw materials session will be under the chairmanship of J. L. Mauther, vice president, Youngstown Sheet & Tube Co.; the session on coke ovens, blast furnaces and steelmaking furnaces will be under the chairmanship of J. E. Lose, vice president, Carnegie-Illinois Steel Corp., while E. M. Richards, vice president, Republic Steel Corp., will be chairman of the shaping and forming session, and Hubert C. Smith, chief metallurgist, Great Lakes Steel Corp., will be chairman of the general metallurgy session.

At the general session to be held in the ballroom of the Waldorf-Astoria on Thursday morning, May 22, addresses will be delivered by Walter S. Tower, president of the institute, Charles E.

Wilson, president, General Electric Co., and Edward L. Ryerson, chairman, Inland Steel Co.

An industrial relations session will be held Thursday afternoon at which an open forum will be conducted by the Committee on Industrial Relations.

The annual dinner will be held at the Waldorf-Astoria Thursday evening. Dr. George S. Benson, president, Harding College, Searcy, Ark., will speak.

Papers to be read at the technical sessions follow:

RAW MATERIALS

"World Situation on Coating Materials—Lead, Zinc and Tin," by Carl A. Ilgenfritz, vice president, United States Steel Corp.

"The Outlook in Merchant Pig Iron," by Bertram S. Stephenson, president, Tonawanda Iron Corp.

"Iron Ore Supply for the Future," by George W. Hewitt, assistant vice president, Wheeling Steel Corp.

"Coke Strength," by Charles W. Stahl, research engineer, Bethlehem Steel Co.

"A Method of Estimating Blast Furnace Production and Coke Consumption," by W. E. Marshall, supervising metallurgist, American Rolling Mill Co.

"The Use of Oil to Improve Coking Coal," by Paul C. Mayfield, superintendent, coke plant, Alan Wood Steel Co.

COKE OVENS, BLAST FURNACES AND STEELMAKING FURNACES

"The Training of Metallurgists for the Steel Industry," by Prof. John Chipman, Massachusetts Institute of Technology.

"A Design for Blast Furnace Hearths," by W. S. Unger, Carnegie-Illinois Steel Corp.

"Blast Furnace Bell Development," by Truman H. Kennedy, assistant general superintendent, National Works, National Tube Co.

"Operation of the Iron Blast Furnace at High Pressure," by J. H. Slater, assistant district manager, Republic Steel Corp.

"Items of Controllability in the Open-Hearth Process," by A. J. Fisher, fuel engineer, Bethlehem Steel Co.

"The Use of Oxygen in Open-Hearth Practice for Carbon Reduction," by F. B. Lounsberry, vice president, Allegheny Ludlum Steel Corp., and G. V. Slottman, manager, Technical Sales Division, Air Reduction Sales Co.

"The Mineralogy of Open Hearth Slags," by J. L. Mouthe, vice president, and K. L. Fetter, special metallurgist, Youngstown Sheet & Tube Co.

SHAPING AND FORMING

"Shaping and Forming," by Willbald Trinks, professor emeritus, Carnegie Institute of Technology.

"Progress in the Manufacture of Steel Pipe with Particular Reference to Seamless Pipe," by E. N. Sanders, vice president, National Tube Co.

"The Metallurgy of Cold Reduced Sheets," by C. L. Altenburger, research engineer, Great Lakes Steel Corp.

"The Design of Roughing Mills," by J. J. Curtin, superintendent of rolling mills, Bethlehem Steel Co.

"The Joliet Coarse Rod Mill," by Richard R. now, division superintendent, hot mills, American Steel & Wire Co.

"Problems Involved in Fabrication of High Temperature Alloys," by Gunther Mohling, associate director of research, Allegheny Ludlum Steel Corp.

GENERAL METALLURGY

"The Selection and Application of Statistical Methods to Steel Plant Processing Problems," by E. L. Robinson, assistant chief process metallurgist, and L. G. Ekholm, head, Metallurgical Development Group, Carnegie-Illinois Steel Corp.

"Supersonic Testing of Steel," by R. R. Webster, research engineer, Jones & Laughlin Steel Corp.

"An Appraisal of Hardenability Band Specifications for Alloy Steel," by Don Ruhne, chief metallurgist, Republic Steel Corp.

"Coatings for Decorative and Corrosion Resistant Purposes on Steel," by R. L. Kenyon, associate director, Research Laboratories, American Rolling Mill Co.

Attendance Heavy at Openhearth Committee Meeting of AIME

REVISION in the labor laws to relieve economic strains and establish some semblance of accord in industry was urged by E. L. Ramsey, chairman, Open Hearth Committee, American Institute of Mining & Metallurgical Engineers, speaking at the opening session of the committee's 30th conference, held at the Netherland Plaza, Cincinnati, April 21-23.

Mr. Ramsey, who will be succeeded in the chairmanship of the committee next year by W. C. Kitto, now vice chairman of the national group and chairman of the Pittsburgh section, said that it was his view that developments in the steel industry will have powerful influence in developing a general wage pattern.

Registration at this year's meeting exceeded 1025, with about 80 per cent

steelmakers and 20 per cent blast furnacemen. Next year's conference of the National Open Hearth Steel Committee and the Coke Oven, Blast Furnace & Raw Materials Committee of the AIME will be held in Pittsburgh.

Simultaneous technical sessions held Tuesday and Wednesday dealt with basic open-hearth practice, cold metal operation and basic foundry practice, metallurgy, refractories and masonry quality. The blast furnace, coke oven and raw materials group held sessions on coal, oxygen, design and operation and metallurgy of the blast furnace process.

A report on the use of oxygen in steelmaking as brought out at sessions of both groups will be presented in an early issue of STEEL.

Sheet & Tube Head Says High Steel Profits Needed for Maintenance and Improvements

NECESSITY for higher profits in the steel industry was never so pronounced as today, Frank Purnell, president, Youngstown Sheet & Tube Co., told stockholders at their annual meeting last week.

"For many years depreciation was calculated as nearly sufficient to pay for replacements," Mr. Purnell said. "Costs of construction and of new equipment have increased to a point where reserves built up by depreciation will cover only a portion of the cost of replacement—in fact as to many units the reserve is less than one-fourth of the replacement costs.

"The need for substantial earnings to create a surplus for these purposes in addition to a fair amount for dividends is an absolute necessity if the company is to continue to meet its obligations to its shareholders, its employees, its communities and the country."

"Because of inflated construction costs and high tax rates, investment capital is not available as it once was for expansion or increase of capacity and we must finance these items largely from our own reserves and surplus."

"Those who criticize the industry for failure to increase further the nation's steel capacity will do well to investigate the facts. We believe present capacity is adequate, except in isolated instances, to care for all normal demands."

"We cannot expect operations to continue indefinitely at present peak levels. Wide fluctuations in business volume will occur from time to time and, as many items of costs are fixed, profits are bound

to vary even more than the volume. It is of extreme importance, therefore, that during high volume periods surpluses be set aside for maintenance and technological improvements," Mr. Purnell said.

"There has been some comment regarding steel prices which were revised in December of last year and January of this year.

"Scrap, so important to the steel industry, has increased in cost at least \$18 a ton since early last fall. Increased railroad freight rates became effective on Jan. 1, 1947, and there is a possibility of further increases if railroad wages are advanced."

"Lake freight increased 11 cents per ton last year, and rates have again advanced 10 cents a ton so far this year. Effective on this year's shipments, prices of iron ore were advanced 50 cents a ton. Coal costs are high and may go higher."

"Material advances were felt in pig tin, spelter, copper and all supply lines, and also on new equipment."

Colorado Fuel & Iron Corp. Reports Rise in Net Profit

The Colorado Fuel & Iron Corp., Denver, reported net profit of \$1,712,323 for the first quarter of 1947, compared with net loss of \$1,667,932 in the corresponding period of 1946. Net profit for the fourth quarter of 1946 was \$876,310.

Net sales and operating revenues in the first quarter of 1947 were \$25,805,553.

Friendly attitude of 80th Congress toward business indicated by character of legislation being prepared and by changed atmosphere in Congressional investigations. Small Business Committee wants to help both big and little companies

WHILE a great deal of publicity has emphasized that the attitude of the 80th Congress toward labor unions is much less patient than that of its predecessors, it is not so generally known that the attitude toward business has undergone an even more pronounced change. The baiting of business which almost continuously featured the sessions of the 73rd through the 79th Congresses is absent in this Congress. Under a coalition of the majority of Republicans and the conservative Democrats, efforts to put business on the grid seldom even get started.

So far the only antimonopoly bills to receive serious attention are H. R. 515 and S. 104—the Kefauver and O’Mahoney bills. These are simple bills, aimed

at closing a loophole in the Clayton Act so as to make it illegal to acquire assets, rather than just stock, when such acquisition would result in a serious lessening of competition. So far other bills to put additional teeth in the antitrust laws have made no headway. For example, the omnibus bill known as S. 72, introduced by Senator Morse with the backing of Senators Aiken, Langer, Young, Murray, Taylor and Kilgore, still is buried in the Senate Judiciary Committee despite earnest efforts of the Antimonopoly Subcommittee chairman, Senator Langer, to get action on it.

But a better understanding of the present majority attitude is derived from conversations with legislators, and from

observing how they conduct themselves during hearings of businessmen. Boiled down, the prevailing view is that it is time to take a rest from the long-continued effort to pin on the businessmen the blame for all our economic ills.

A good illustration of this attitude came during the appearance before the Senate Small Business Committee of C. A. Johnson, general manager of sales, Fabrication Division, Bethlehem Steel Co. The committee was investigating a complaint that independent companies have less opportunity than formerly to get contracts to erect fabricated structural steel because the integrated steel companies, Bethlehem Steel Co. and American Bridge Co., have their own erecting departments. The senators who did most of the questioning—Martin (Rep., Pa.) and Wherry (Rep., Nebr.)—interrupted on numerous occasions to assure Mr. Johnson that they are friendly to big business.

"My attitude," said Senator Martin, "is friendly toward the big companies in the steel business—Bethlehem, United States Steel, Jones & Laughlin, National and the others. We do not want to do anything to hurt them, as to do so would hurt the country. Our problem is to provide help for the small people; we will have to find out how to encourage more small people to go into business, and stay in business if the private enterprise system is going to work."

"And that is where we want your help," added Senator Wherry. "Big business alone cannot make the country prosper; we want big business—and we want small business."

New Attitude Toward Business

A striking instance of the new way of looking at business was reflected in Senator Capehart's solution of the problem of preventing the closing down of small weekly newspapers due to the shortage of newsprint. Following a series of hearings, he put the problem up to a committee of large publishers and paper producers. Now, instead of seeking a long-term solution through a new grant of governmental power, Senator Capehart has introduced a bill, S. 1080, which is something brand new in seeking to solve problems of industry in times of peace. The bill would give antitrust law immunity to an industry committee charged with the obligation of finding paper for small publishers unable to get it through ordinary market channels. The committee would be comprised of industry representatives entirely and the government would have its hand in only in the capacity of observer.

Senator Capehart does not consider the pattern laid down in S. 1080 as pointing



BUY STEEL PLANT: W. R. Maroney, left, assistant treasurer, Republic Steel Corp., presents check for initial payment for surplus government steel plant at Chicago to F. D. Gallagher, right, head of the real property division, War Assets Administration, Chicago. Standing is W. W. Hancock, vice president and secretary of Republic

The CONE AUTOMATIC MACHINE COMPANY

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It is reported that

Ralph C. Coxhead Corp. of New York has a new Vari-Typer that uses 600 styles and sizes of type, plus foreign language, chemical, mathematical and other symbols.

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Patent 2,409,181 covers a sectional motor truck that can be separated into three pieces and carried anywhere by air.

be ready with CONE for today

Stromberg-Carlson has a new inexpensive adaptor that will enable most owners of pre-war FM sets to receive broadcasts on the new band.

get ready with CONE for tomorrow

Frigidaire, Division of General Motors, is making a plastic lid for its ice cream cabinets that is claimed to be 50% lighter than steel.

be ready with CONE for today

New England Carbide Tool Co. is taking tungsten carbide to the housewife in its new precision knife sharpener.

get ready with CONE for tomorrow

The State of Minnesota will go into business with Continental Machines, Inc. to engage in a continuous chemical process for the extraction of pure iron from slate formerly wasted at the Mesabi iron range.

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The New Holland Machine Co. of New Holland, Pa., will test its new flame cultivator on truck and garden crops in the Rio Grande Valley this winter.

get ready with CONE for tomorrow

Bell System's first experimental rural radio-telephone circuit connects 8 Colorado farms with the Cheyenne Wells central office. Wind driven generators supply power.

The four largest alternating current motors ever built, 65,000 horsepower each, will be made by Westinghouse for Grand Coulee.

be ready with CONE for today

Lockheed's Little Dipper light plane is reported to cruise at 100 m.p.h. and land at 20.

get ready with CONE for tomorrow

A mobile alcohol plant built into a five car train that could travel from farm to farm was demonstrated at the National Chemical Exposition.

be ready with CONE for today

Phthalic anhydride, one of the most important ingredients in the manufacture of paints, is now being made from petroleum by Oronite Chemical Company.

FOLLOW THESE PAGES FOR NEWS OF PROGRESSIVE PRODUCTION



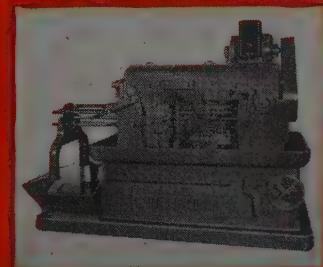
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Climax Molybdenum Corp. is working on two new high temperature alloys. One has 60% chromium, 25% molybdenum and 15% iron. The other has 60% chromium, 15% molybdenum and 25% iron.

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The Gyro-Glider developed at the General Electric Flight Test Center has a rotor instead of wings and weighs 120 pounds, ready to fly.

be ready with CONE for today

M. W. Kellogg Co. has a new process for separating a considerable number of useful substances from fish and vegetable oils using liquefied propane at high pressure.

get ready with CONE for tomorrow

The Texas Company's new cold weather aircraft fuel is claimed to start an engine and to permit switching to regular aircraft gasoline in two minutes, in spite of extremely low temperatures.

an exact solution to the problems of all industries. The newsprint industry, he says, is fairly compact—with relatively few producers, and with the end product used by all consumers for the same purpose. It would not be applicable for steel. The senator believes, however, that his bill provides a new way of handling industry problems—by men in the industry who are intimately informed about these problems. Variations of this plan, he hopes, can be devised to allow other industries to organize in order to act on problems in their industries. This new method, he feels, offers several advantages: It provides for solutions by the best informed men; the industry committee's plan of action will usually receive whole-hearted compliance and cooperation; and it should bring desired results without creating new bureaucracies and without increasing the cost of government.

Left-wingers Perturbed by Changes

Dyed-in-the-wool left-wingers on Capitol Hill and elsewhere in Washington, of course, are much disturbed and discouraged at this change in atmosphere. Some who only recently wielded a lot of power are angrily disgusted. For example, Rep. Mary Norton (Dem., N. J.) has resigned from the House Education & Labor Committee. As chairman of that committee, the urbane, personable congresswoman stood as a stone wall in the path of all suggested amendments to the Wagner Act, and the Case bill of 1946 had to be by-passed around her. Questioned on the House floor as to why she had resigned, Mrs. Norton said it was because of lack of respect for the new chairman, Fred A. Hartley Jr. (Rep., N. J.), "who comes here and talks as if he knew something about labor." To newspaper reporters, Mrs. Norton said she gets so disturbed over the way things are going nowadays that she frequently goes home and has a "good, old-fashioned cry."

The two small business committees which at present are the most active congressional units in studying business problems are demonstrating a policy of investigating only such situations as seem to demand attention. For example, the Senate Small Business Committee has been receiving complaints from small businessmen that they are unable to get steel. However, the committee now believes there will be a substantial easement in the next few months in the relationship of steel demand to supply. The committee has received assurances that the steel industry is doing a pretty good distribution job, also that the "gray" market in steel is a small affair at best.

The House Small Business Committee at present is studying the factors that are holding up housing construction, and its witnesses so far have been recruited from

the building and construction and mortgage banking industries. This committee may look into the current spread between plain and fabricated shapes as quoted recently in bids for the steel frames for veterans hospitals. Evidence submitted at the recent Senate Small Business Committee hearing indicated that current market prices on fabricated and erected steel, as demonstrated in the case of the Fort Hamilton Hospital, Brooklyn, N. Y., run around \$180 to \$183 per ton. This includes the market price of \$54 a ton delivered New York for plain material, around \$39 or \$40 per ton for erection, leaving \$86 to \$90 to cover fabricating and other expense.

One inference was that the fabricating charge may be unduly high right now because of the need for spreading overhead over an abnormally small tonnage of fabricated work, and that it will tend to go to a lower level later this year when, as expected, the supply situation in structural material becomes easier.

While the Senate Small Business Committee plainly indicated its friendly attitude toward the big steel companies in the structural field, the committee showed that this friendliness did not extend so far as to permit the steel companies to charge unduly profitable prices on steel for veterans hospitals. This phase developed when Brig. Gen. John S. Bragdon, the War Department's construction director, thought it had not been ethical for the Army Engineers to ask for another set of bids on the Fort Hamilton hospital without any change in plans or specifications to warrant it. The reason, he said, was that after a low bidder's price has been publicized he has to reduce that price in order to bid effectively in the second opening. The committee did not give General Bragdon any support on this line of reasoning; on the contrary, the committee was gratified to learn that the government, by taking a second set of bids on the Fort Hamilton hospital, had saved more than \$19,000.

Philippines Need Steel

Requirements of steel products for use in repairing war damage in the Philippine Islands are of substantial size, and efforts again are being made to pry loose some tonnage to make a good start on the program. Recently representatives of H. E. Beyster Corp., industrial consultant, 2100 Industrial Bank building, Detroit, has been sounding out interested government departments and agencies, also steel companies. The Beyster organization, on a retainer from President Roxas, has completed a two-year industrialization program for the Philippines, and it is the carrying out of this program with which it now is concerned.

The Beyster plan calls for many items

of which the following are the principal ones: Structural shapes, 7718 tons bars, 95 tons; plates, 896 tons; floor plates, 117 tons; sheet steel piling, 1377 tons; pig iron, 610 tons; tin plate, 3400 tons; black sheets, 2000 tons; rivets, 2100 tons; galvanized wire, 2100 tons; galvanized rivets, 750 kegs; galvanized roofing washers, 1500 kegs; nails, 64,440 kegs finished nails, 1100 kegs; black pipe, $\frac{1}{2}$ to 6-in., 418 tons; galvanized pipe, $\frac{1}{2}$ to 6-in., 3500 tons; drive pipe, 25,000 linear ft; drive shoes, 3500 pieces; sucker rod 400 ft; conduit pipe, $\frac{1}{2}$ to $2\frac{1}{2}$ -in., 60,174 pieces; wire rope, 462,500 ft; 70-lb rails 26,600 tons; track supplies in corresponding volume.

The above quantities represent quarterly requirements over the next two years; therefore, the total requirements are obtained by multiplying the above figures by 8.

The Beyster list calls for the following items over a 5-year period: Concrete reinforcing bars, 41,685 tons; galvanized corrugated roofing sheets, 222,126 pieces; galvanized flashing sheets, 166,000 pieces. It also calls for 250 pairs of freight car axles with wheels, 100 pairs of passenger car axles and wheels, a tonnage of car roofing sheets, 1471 tons of material for water and oil storage, and 1695 tons for railroad turntables.

Program To Be Philippine-financed

The Beyster program is a strictly Philippine program, to be financed by the government and by Filipino nationals. It is assumed in Washington that part of the money that will be required in carrying out this program will flow to Filipino private interests out of the \$400 million appropriated by the United States Congress in 1946 to settle private war damage claims in the Philippines.

It is entirely separate and distinct from the United States government program which calls for expenditure of \$120 million—later to be increased perhaps by another \$100 million—in repairing and rehabilitating war-damaged public works and buildings in the Philippines. This will include principally bridges to be constructed by our Public Roads Administration.

Lack of steel held up the Army Engineers when they failed to obtain any bids on the following items for work in the Philippines: Black sheets, 1800 tons; galvanized roofing sheets, 12,000 tons; concrete reinforcing bars, 3200 tons; structural shapes, 1138 tons; plates, 737 tons; pipe, 2135 tons; nails, 2970 tons; electrical wire and cables, several million feet; cement, 100,000 barrels. Present plans are to delay procurement of this and other material until the United States supply situation eases.



CARILLON TO STAMFORD: A 36-bell carillon, the largest bell weighing more than 2 tons and the smallest about 21 lb, is loaded aboard the liner AMERICA at Southampton, Eng., for shipment to Stamford, Conn., where it will be installed in a church. The carillon was given to the city of Stamford by the Nestle Co. in appreciation of the kindness extended to the employees of the company who were evacuated to the city from Switzerland during the war. Twenty-two of the bells, representing the 22 cantons of Switzerland, each carries a canton shield. NEA photo

determine the exact influence of these price cuts on uncontrolled agricultural products, and foodstuffs. It is interesting to point out that the value of the French franc on the unofficial market is steadily rising and there is a correspondingly sharp slump in the black market quotation of foreign exchanges. Pound sterling notes are on sale for 610 francs as against 900 three months ago and dollar notes are around 240 francs as against 330 at the end of 1946.

The French government intends to continue in its policy of lowering prices, but the next step will not be a new general cut of 5 per cent, but will be limited to those products which could bear it without loss to the producers. Consequently investigations will be made to study the production costs of every variety of product and those whose prices show large profit margins for the producers will be ordered cut down.

The communist Minister of Labor emphasizes France's need for labor measures to combat shortages and suggests the drafting for work of persons who are not engaged in productive employment, something similar to the measures taken by the Germans in France during the occupation and called service of compulsory labor.

The government also plans to use 30,000 men and women who are in prison as collaborationists for civilian labor. France faces a deficit of 530,000 workers by the end of 1947 due to the loss of war prisoners. The first contingent of Italian workers is expected to arrive in France next month.

The Minister of National Economy predicts that the present rationing of food and raw materials will have to be maintained for another two or three years until production has become sufficiently plentiful to insure equal distribution.

Allotments of steel for the second three months of this year have been decided by the government. They are equal to those of the first three months and are below requirements. These are figured out at 2,800,000 tons but steel deliveries will be only 1,400,000 tons, of which 50,000 will be imported.

Cost of Living Turns Downward in France; Reflects Government Action

Government will continue policy of ordering price reductions but will limit decrees to products where producers can bear cuts without incurring loss. Communist Minister of Labor suggests drafting of Frenchmen for work

FOR the first time since May, 1946, cost of living index in Paris shows a marked decline, according to the latest figures published by the Service Nationale Statistique, a branch of the French Ministry of National Economy. The composite index for 34 articles, including foodstuffs, heating, lighting, declined to

838 from the all time record of 858 in February and 856 in January. These indexes are calculated on the basis of 100 for the average prices of 1938.

To a certain extent these decreases can be regarded as the first effects of the two price cuts decreed by the Blum government. But it should be more important to

Estimate Britain Requires 26,000 Tractors Annually

United Kingdom has an estimated requirement of 26,000 three-and four-wheel tractors, an American report on British tractor production states.

February production was at an annual rate of 25,000 to 30,000, with the Ford Co. Ltd., at Dagenham, Essex, accounting for 75 to 80 per cent of the total in use during the month. Exports in 1946 totaled between 9500 and 10,000, principally to Empire countries and UNRRA.

Industries of Pacific Northwest Seek To Offset Higher Wage Costs

More efficient machinery and equipment being installed to provide greater operating economies. Waste materials of forests being utilized in new products. New power sources to be required to permit industrial expansion

By R. C. HILL
Editorial Correspondent, STEEL

SEATTLE

WESTERN Washington industries are installing more efficient machinery and equipment in an attempt to achieve greater operating economies to offset increased wage, freight, and other costs.

Present power supply is hardly sufficient for immediate needs and further expansion of industry in the Pacific Northwest will require additional power sources.

Waste materials from the forests are being utilized in new products. Many towns which formerly depended almost entirely upon the production of lumber are reconciled to the decline of this industry and are seeking to establish new industries.

The larger industries, including aluminum, lumber, plywood, pulp and paper, are operating at capacity. Currently they are unable to meet domestic demands, but are keeping an eye on the export market for the future.

Labor relations generally are fairly satisfactory. Skilled labor supply is inadequate.

These are some of the observations made by the writer during a recent tour of western Washington.

"More power than is now available is needed," states Arthur Johnson, manager, Reynolds Metals Co., Longview, "before we can expand. Aluminum production is now up to the war level but for larger operations in the future we must be assured ample power for 20 years. It is logical to locate here because of the potential supplies of power. Deposits of bauxite ore in Jamaica and Haiti are sufficient for 30 years' operations."

J. P. Weyerhaeuser Jr., vice president, Weyerhaeuser Timber Co., says his firm plans to adjust its cut to the annual growth on lands owned by the firm. Both natural and artificial seeding is depended upon to assure a sustained yield of timber and in five years it is expected that the planting program on logged-off lands will be up to requirements. He also stated that all waste from logging and production is now being used—small pieces of lumber for furniture, forest waste for

pulp making. For the first time, also, use is being made of bark which is now ground fine for insecticides and conditioners. One of his plants operates ten Pres-To-Log machines which press wood waste into fuel logs as hard as oak. Plants are discarding their fuel burners, large steel caissons where sawdust, slabs and other mill waste were formerly burned. These economies have increased the timber supply by 15 or 20 per cent. Weyerhaeuser operations are based on a timber stand of 500,000 acres, of which 340,000 are timbered and 160,000 in a regenerating state. This firm is installing at Longview a sulphite recovery plant and constructing a new sulphate pulp mill and a plywood plant.

Industrialists in this area are agreed that the Forest Reserve should permit removal and use of ripe and fallen timber on government lands, to conserve growing stands of virgin forest. They believe the same policy should be adopted by the National Park service on whose lands much timber is decaying where it falls.

Some of the industrial highlights in other western Washington centers are

Grays Harbor, Aberdeen and Hoquiam. Turning to diversified industry to replace the income formerly coming from lumber production. These include plywood, fishing, sash and doors, agriculture, cattle and oil exploration. Some of the largest oil companies are drilling in this area. Population diminished during the war but is now returning with more employment available. The Lamb-Grays Harbor Co., which had extensive war contracts, is the largest metal fabrication operation in the area and is now producing machinery for logging, paper plant milling and other activities.

Olympia: Jensvold Mfg. Co., which fabricated airplane parts during the war has turned to postwar light metals fabrication, including metal bottoms for showers, cooking trays, shelving strips, etc. Olympia Brewing Co. is installing 23,500 barrel tanks and has awarded a contract to Firestone Tire & Rubber Co., Los Angeles, for stainless steel kegs, replacing wood, steel and aluminum, previously used.

A nonprofit corporation purchased 2 square blocks in the city to be sold for industrial use at 11 cents a square foot. This area is close to railroad and water transportation and is being rapidly purchased.

Tacoma: Largest projected development is the \$1 million paper plant which St. Regis Paper Co. will erect soon. A powdered metals plant has just begun



BIG SCOOP: This 500-ton dragline, a 9-W Monighan built by Bucyrus-Monighan Co., is excavating the main canal of the Columbia Basin project. The dragline can handle 15 yards of rock or 20 yards of earth in a single bite and in a 24-hour shift will move 9000 yards of rock or 12,000 yards of earth

production. Birchfield Boiler Works is engaged in steel shipbuilding and general tank and boiler work. The Marine Iron Works has been converted from war work to production of small farm tractors with implement attachments.

Bellingham: This town's sawmills have disappeared but aggressive salesmanship is attracting new, small industries. Largest operation is the Puget Sound Pulp & Timber Co. which is completing a paper board plant to be operated by Bellingham Paper Products Co. This plant is housed in a modern steel building and has capacity of 45 tons paper board daily. The firm recently purchased a government-built alcohol plant and is producing 7500 gals. of 190 proof ethyl alcohol from pulp mill waste liquor. Daily production of pulp is 360 tons of high grade, unbleached sulphite. The new paper board plant is equipped throughout with stainless steel pipes. This city has an adjacent coal mine operation. Potential deposits of chrome, manganese and other metals are being surveyed in the nearby area.

Shortages Hamper Everett Industry

Everett: Weyerhaeuser Timber Co., Everett Pulp & Paper Co. and Sumner Iron Works are the principal industries. New plants under construction include American Wood Treating Co. Sumner is manufacturing heavy logging, lumber and pulp mill equipment and reports renewed interest on the part of foreign buyers. The Everett Shipbuilding & Drydock Co., which employed 6500 during the war, is now engaged entirely on repair work with a payroll of 600. The Washington Coke Works, established in 1903, has a large backlog, but is handicapped by shortages of sheets, pig iron, cast iron and motors. Only three of its 12 models are being produced due to the scarcity of steel sheet. This firm uses about 10 tons of material daily.

Seattle: Kirsten Pipe Co. has a new plant in which much attention is paid to providing attractive working conditions. It uses considerable aluminum in the manufacture of pipes and cigarette holders. To insure continuous operation the company also manufactures an automatic steering gear and electric reverse control. Western Gear Works is operating readily. This firm has developed and producing a beetle field tractor bulldozer, of value to the forest service and for commercial use, in addition to transmissions, gear units, logging and oil field units. Present employment is 300. Penworth Motor Truck Corp. has a year's backlog on hand and is expanding its foreign market, and has an order for 50 heavy duty trucks for the Arabian American Oil Co. Todd Seattle Dry

Docks Inc. has a heavy backlog of ship repair work, employing 3000 at present. This company's wartime payroll, including two shipyards, was 45,000. R. J. Lamont, president, reports that labor efficiency has improved 20 to 25 per cent since the end of the war and is as good as in the prewar period. Tyle-Board Co., now manufacturing wall board, plans resumption of manufacture of bath room shower sets as soon as possible when cold-rolled sheets are available. Needs are one carload daily.

U. S. Steel, Utah Skirmish Over Sales Tax on Geneva

Study of whether the sale of the Geneva steel plant by the government to United States Steel Corp. is taxable under the Utah sales tax law is being made by that state's tax commission. If the state decides the transaction is taxable, it is thought likely the case will be carried to the United States Supreme Court because of some of the unprecedented issues which have been raised.

The property involved in the tax case is movable equipment in the plant and certain types of inventories. Land, buildings and stationary equipment are exempt under the sales tax law.

The steel corporation maintains its purchase of the property was an isolated sale and as such was exempt from the law. It contends the transaction was the bulk sale of a going concern, rather than the sale of individual items.

The tax commission, on the other hand, regards the transaction as a sale of surplus property by the government, and as such is subject to the tax law.

High Costs on West Coast Cause Expansion Delays

All along the West Coast industrial firms are "striking" against the high cost of building construction. Increased costs rather than materials and labor shortages now appear to be the principal factor retarding many plant expansions.

Up to now there has been no sign of a break in these high prices. However, as more prospective work is postponed and production of materials is increased, competitive factors will tend to start costs downward.

During the last year building costs have gone up tremendously. A boost of only 20 per cent is thought exceptionally low, and many prices have more than doubled. Some building, which can not be delayed, is progressing, and one company in the "can't wait" category has been quoted increases of about 15 per cent every three months on a project it now has under construction.

Lower-Cost Pig Iron Seen from Fontana Mill

Kaiser plant, currently installing new pipe and strip mills, expects to lower production costs further

PRODUCTION costs are being progressively reduced by the Fontana, Calif., steel mill of Kaiser Co. Inc., according to Francis M. Rich, vice president in charge of operations.

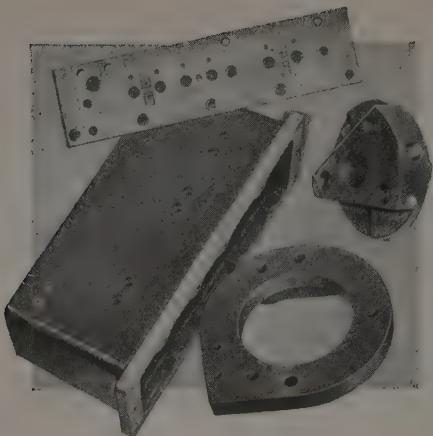
"Pig iron now is being produced for nearly \$1 a ton less than in 1946 and costs will be reduced further by about \$2 a ton when the blast furnace switches over to Eagle Mountain ore in mid-1948," Mr. Rich said. "At present about 40 per cent of the ore is coming from the Vulcan mine at Kelso, Calif., and the balance from a mine near Cedar City, Utah."

Mr. Rich expects the blast furnace to operate another 2 or 3 years before relining is required. This furnace is averaging 1200 to 1300 tons of pig iron daily with coke consumption of just over 1400 lb per ton and flue dust production of less than 100 lb per ton. This is considered comparable with the best practice in the East. Steel ingots are being produced at a cost per ton which is considerably below the price of No. 1 steel scrap at Pittsburgh.

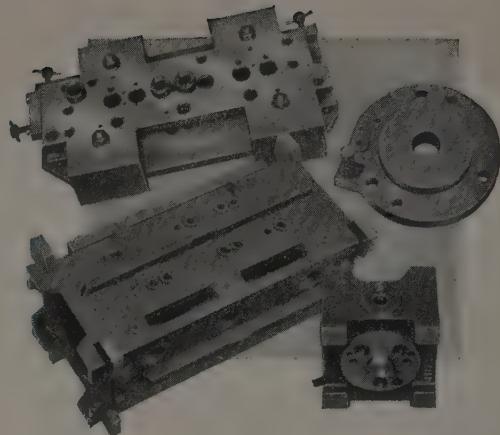
Building New Pipe, Strip Mills

A new mill building is nearing completion for housing a new Fretz-Moon butt-weld pipe mill which is expected to go into operation late this summer. It will turn out pipe in sizes ranging from 2 to 4 in. in diameter. A new cold roll strip mill is being installed and should be in operation by fall. It will roll strip up to 16 in. maximum. The company's present 8-stand continuous roughing mill will provide skelp for the new pipe mill and hot strip for the cold mill. A new 3-high roughing mill will be put in operation in the present merchant mill building by Jan. 1. This 3-high mill will increase the merchant mill's capacity to approximately 35,000 net tons per month.

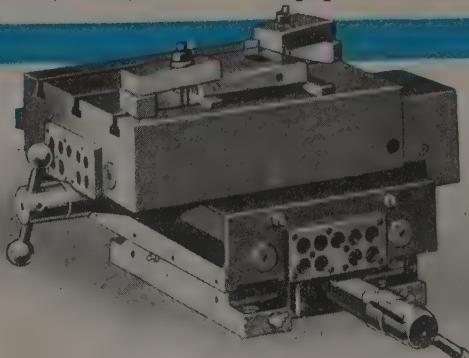
Mr. Rich said he felt the company was justified in asking for a reduction in the loan held by the Reconstruction Finance Corp. inasmuch as the mill was built to supply sorely needed plates and shapes for ship construction during the war. He said he felt the Fontana case was comparable to others wherein the government built complete plants which have been sold at 20 cents on the dollar.



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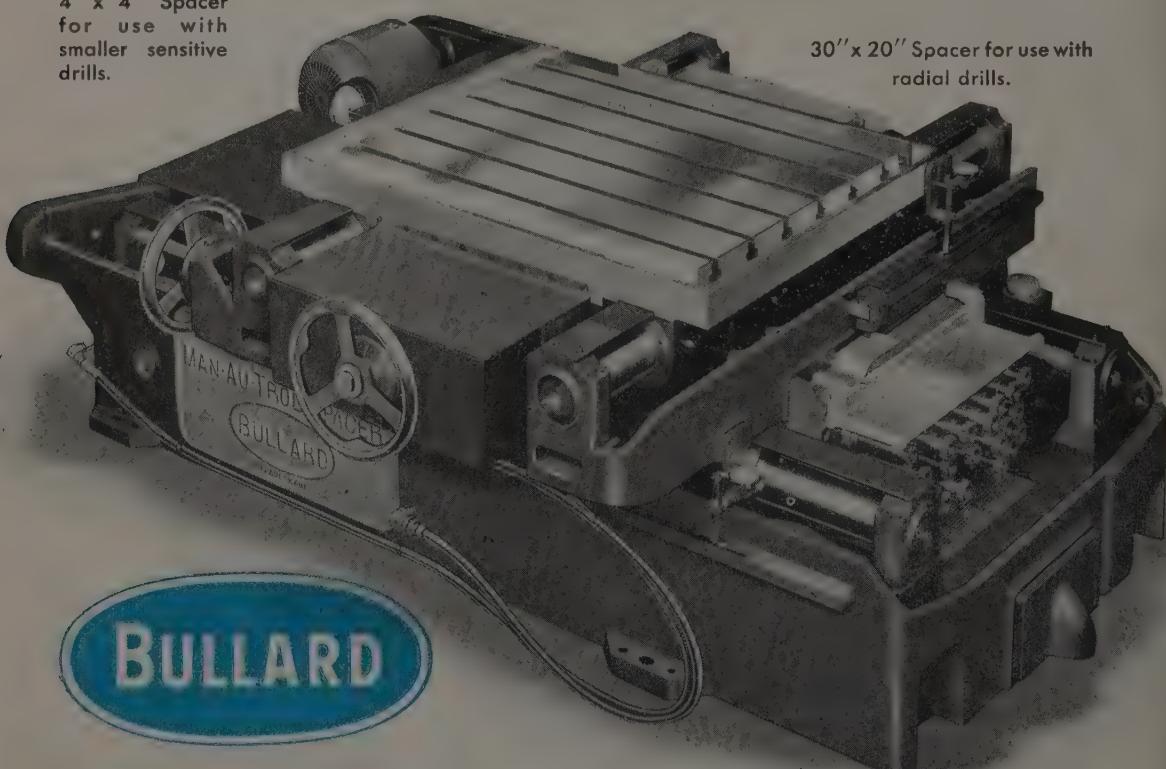


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BULLARD CREATES **NEW METHODS** TO MAKE MACHINES DO MORE

New national wage pattern based on equivalent of 15-cent hourly increase sweeping mass production industries. Unions rush to defend selves against labor legislation now working its way through Congress

DETROIT

LIKELY by the time this comment appears in print, the UAW-CIO will have concluded agreement with General Motors for a wage increase equivalent to about 15 cents hourly, as the snowballing wage increase "pattern" appeared to engulf earlier efforts of the union to force a 23½-cent increase. The offer of "11½ plus 3½" cents, duplicating the increase already granted electrical workers and rubber workers, and echoed in the steel industry settlements, was made to the UAW on April 18. The next day, the union released its postponed 58-page economic brief in support of the 23½-cent boost, but after Murray's restrained statement in connection with the steelworkers' case, Walter Reuther, UAW president, was in a worse quandary than ever, being practically forced to accept the "pattern" increase and at the same time support the contentions of his printed report.

Reuther Asks Welfare Funds

According to the grapevine, the first move made by Reuther upon returning to Detroit was to offer GM a scaled-down settlement on the basis of 11½ cents an hour increase, plus 3½ cents more in the form of a welfare fund, to be administered by no less a person than Mr. Reuther himself. The GM negotiators simply smiled and said, "Good day."

Meanwhile, the UAW hurriedly scheduled another of its well-known Cadillac Square mass meetings for Thursday afternoon from 2 to 7 p. m. and most plants with UAW locals regarded the 5-hour shutdown as inevitable. Curiously the theme of the mass assemblage was given as "Defend Your Union," marking one of the first occasions within memory when CIO unions have had to go on the defensive. In this case, the defense is directed against labor legislation now moving through Congress. Leaflets titled "This is Labor's Day" were tossed all over town in copious quantities, and union locals in various sections of the city drew up plans for marches to converge in the downtown rally.

Examination of the previously mentioned "economic brief" in support of the 23½-cent wage hike, reveals it to follow closely the Nathan report issued months ago in behalf of steelworkers.

In fact, the first page carries a reproduction of a letter from Nathan commending the report. Basically it is tied to the fallacious union philosophy that the only way to sustain prosperity is to keep bolstering purchasing power by the simple device of transferring corporate profits to wage increases and price re-

during the General Motors strike and subsequently proved full of inaccuracies, false assumptions and loose reasoning.

Many of Reuther's promises are faulty. In the first place, autoworkers and others are not being priced out of the market for manufactured goods. This seems evident from the fact every auto manufacturer has order backlogs for as far ahead as he can see, and at today's prices. Until supply of new cars catches up with an apparently insatiable demand there is not too much cause for immediate concern over prices of automobiles. On the score of food and clothing, where increases have been much greater than the boost in car prices since 1941, the story may be somewhat different, but in this case there is the strange anomaly of a government on the one hand protesting high prices and on the other providing millions of dollars of subsidies to support prices, buy up surpluses and destroy them, etc.

In the second place, it has never been a cardinal sin for business to earn a profit in this country. Good profits insure the continuity of business and the maintenance of employment in poor times. Certainly no autoworker would countenance a 30 per cent reduction in wages if his employer should experience a 30 per cent reduction in profit.

Union Has No Suggestions

Further the union has nothing to suggest on the score of more work for more money. If in truth autoworkers are becoming so hard pressed, why not work four more hours every week? C. E. Wilson of General Motors proposed this in 1945 and was hooted down in derision. Bernard Baruch repeated the suggestion a couple of weeks ago. If workers are in such an economic squeeze, how is it that 18,000 can walk off their jobs for two whole days in protest over the reclassification of a handful of employees (as at Hudson recently) and thereby lose an estimated \$25 each which can never be made up with any kind of wage increase? If working people are in such a tough fix why is it that when a crew is asked to work a day overtime at premium pay, it is on the absentee list on the next day at regular pay?

For 14 years, there has been a fairly complete negation of fundamental economic principles in this country, particularly in government and in labor unions. As a matter of fact, persons, say, 21 years old or under, have had no conscious knowledge of any type of economic thinking except the New Deal variety, so perhaps they can be excused for not realizing such things as the basic

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	442,242	140,738
April		248,108
May		247,620
June		216,637
July		331,000
August		359,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

Estimates for week ended:

April 5 . . .	97,385	47,735
April 12 . . .	97,893	50,425
April 19 . . .	103,148	58,565
April 26 . . .	105,000	64,559

ductions. The discussion is full of diatribes and near-invective toward industry "price boosts planned and executed by American business for the purpose of profiteering" . . . "Last year's wage increase stolen from workers by inflation" . . . "autoworkers cheated of the fruits of seven years of struggle and sacrifice to win a better life" . . . "attempt of employers to isolate unions and to turn the power of public opinion against them is an old weapon."

Again presented are union estimates on future costs and profits, contrived to show graphically how supposed large profits might well be diverted to higher wages and lower prices. It is the same old rigamarole used by Reuther in his first "economic brief" distributed



Section of the Newcomb-Detroit Experimental Room, which is aiding companies with metal finishing problems, is shown above. Three men at right are inspecting finish on a sample that has just been sprayed and oven-dried. Two men at rear are operating gauge on control panel to check temperature in the oven and temperature on part in the oven

laws of supply and demand. At any rate, seasoned observers right now believe the only sound way out of the current economic unbalance is hard work and steadily increasing production. This will bring prices down and wages up. The change cannot be wrought overnight by sharp words from the President or his economic advisors, any more than it can be by arbitrarily shoving wages up on the assumption profits can take care of the increase.

Admittedly, industrial leaders do not like the "pattern" type of wage increase now evolving again; they have acceded primarily in the interests of keeping production going without interruption, recognizing full well the squeeze it places on thousands of smaller companies whose hope of survival must rest in steadily higher volume of output. It appears almost a certainty, for example, that all automobile companies, along with their thousands of suppliers, will have to keep step with the wage increases being given by the larger industrial units.

Expands at Highland Park

Ford production plans for 1948 will include increase of manufacturing facilities at the Highland Park plant, primarily to shorten the shutdown time involved in any model changeover period. By using the additional space to be made available at Highland Park for new machinery for 1948 manufacturing, current operations at the Rouge can proceed without interruption until the actual changeover occurs.

Activities scheduled to be moved are

rear axle and rear axle assembly, propeller shafts, drive shafts, motor oil pan, front end suspension and fly wheel housing. Other sections which may be moved are the gas tank and running board operations and, if there is sufficient space, axle shaft machining.

This move and the recent transfer of the final truck assembly line to Highland Park are described as steps taken under the company's decentralization and expansion program after analysis of Rouge facilities disclosed any further expansion within the plant would result in overcrowding. Company manufacturing plans for 1948 call for use of the vacated space in the Rouge with additional personnel to handle expanded operations.

It is hoped to start actual installation of the new machinery at Highland Park the latter part of September. As a step to make room, the company has asked three tenants to move as soon as possible.

Aids in Finishing Problems

A fully equipped experimental laboratory for the assistance of companies having problems related to metal finishing has been in operation for about a year at the plant of Newcomb-Detroit Co., and a number of manufacturers have made profitable use of the equipment which is available at no cost. The shop is equipped with full-size water-wash spray booths, water-wash air supply equipment and gas-fired drying ovens of both the convection and radiation types.

Smaller manufacturers often do not have the facilities to run tests to prede-

termine temperatures, time, cycles and finishes to be used in particular jobs they are contemplating. On the other hand, larger manufacturers may have experimental departments of their own, but are generally concerned with the development of the process itself rather than with the investigation of newer and more efficient types of equipment to be used in painting and low-temperature heating processes. Thus it has proved worthwhile for this manufacturer of spray booths, ovens and gas heating equipment to set up production-type equipment in a laboratory and to offer it to industry generally for test and development programs. Newcomb-Detroit provides the facilities and an operator to run them, asking those interested in using the equipment to furnish their own parts and materials as well as cognizant personnel from their own plants actually to conduct the tests.

Ford, among the motor companies, has made extensive tests on the drying of synthetic enamel finishes in the laboratory, in the effort to standardize on types of equipment and methods which will provide accurate color matches between parts made in different assembly plants throughout the country.

Equipment includes a convection-type drying oven 6 x 20 ft high with a direct-fired gas heater and recirculating fan having capacity of 1,000,000 Btu per hour, holding the oven at any point between 100 and 500 degrees F.; and a radiant-type oven of the same size with radiant refractory burners along the base and a recirculating fan. This oven is a relatively new type and provides fast "bring-up" time where work is relatively thick. Also in the setup is a packaged, preassembled water-wash air supply unit, using either gas or steam heat, for cleaning and heating outside air supplied to spray booths; as well as two types of water-wash paint spray booths, one with water pump and suction fan, and the other with only the suction fan.

Tucker Mockup Shown

A group of news men recently conducted through the Tucker Corp. plant in Chicago saw a clay mockup of the passenger car which Mr. Tucker hopes to have in production by July, as well as two hand-built models in process of construction. About 600 are now at work in the plant, including engineers developing cost sheets and master layout plans and toolroom personnel. The corporation is expecting to file a statement shortly with the SEC coverings proposed sale of 4,000,000 shares of stock at \$5 per share.

VICKERS HYDRAULIC EQUIPMENT

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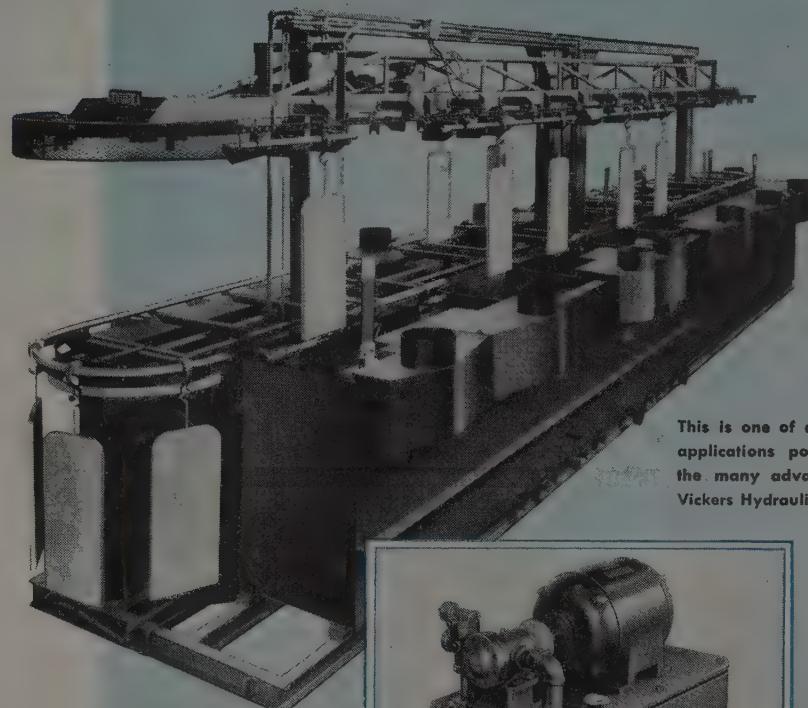
Udylite machine does a complete job automatically . . . taking part through seven tanks and a chamber . . . timing exactly the val in the various solutions foring, plating and rinsing.

part (or rack of parts) is automatically lowered into each of the seven tanks in turn—then lifted out and transferred to the next tank. This might be done with a multiple dip conveyor. But conveyor slants permissible in going and raising in that way reduces extra tank length.

ite made the machine far more compact—saving 18" to 24" in the depth of each tank—by using Vickers Hydraulic Equipment to raise and lower the entire conveyor assembly at each transfer. By this means, each piece (or rack) is lifted straight out of the tank, moved over the next tank and lowered right down. This provides better rinsing and more uniform plating—faster drainage and less contamination of solutions.

Vickers Hydraulic Power Unit and Control Valves have many advantages for such applications: (1) proven dependability, (2) accurate control and precise timing, (3) flexibility of control to suit varied production requirements, etc.

versatile features of Vickers Hydraulic Equipment on this



This is one of a series of applications pointing out the many advantages of Vickers Hydraulic Controls.

Above: Elevated position for transfer from one tank to the next.



Vickers Hydraulic Power Unit.

type of application, as on many other industrial installations, have made possible increased production, improved product quality, greater safety, and lessened physical demands upon labor while increasing its productivity. Vickers Application Engineers will gladly discuss your individual control problems.

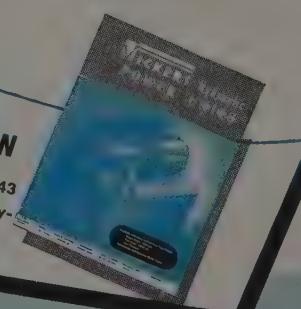
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New BULLETIN

Write for Bulletin 46-43
describing Vickers Hy-
draulic Power Units.



Start Work on New Warehouse In St. Louis

Construction proceeding rapidly on U.S. Steel Supply Co. project which had been postponed since early 1945

WORK of erecting the new St. Louis warehouse building for United States Steel Supply Co. at Sarah St. and Duncan Ave. has begun and is proceeding rapidly, Lee F. Niemann, St. Louis district manager for this U. S. Steel subsidiary, announced last week.

Construction of the new building, which was planned early in 1945, was delayed due to extended delivery schedules of fabricated steel which made it impossible to begin the steel erection until this month.

The new warehouse will be equipped with modern cutting, processing and handling facilities, and will consist of four aisles, each about 375 ft long, and one transverse aisle which will expedite loading of steel for shipment. Steel arriving on the plant's railroad siding will be stored, processed and handled in the aisles and will be loaded on delivery trucks on the opposite side. Trucks will enter at the Sarah St. entrance, load in the delivery section at the north end of the plant and exit through another gate on Duncan Ave.

The supply company has for years maintained a steel warehouse in St. Louis, and the new facilities are designed to supplement its service.

Jones & Laughlin Erecting Addition at Oil City Plant

Jones & Laughlin Steel Corp., Pittsburgh, is erecting an addition to its present strip storage building of its electric-weld tube plant in Oil City, Pa. This construction will add about 5000 sq ft of floor space to the present building and will almost double the strip storage capacity. The company is also completing installation of the sixth welding mill unit at Oil City which will double tubing capacity over that of Jan. 1, 1946.

Nooter Boiler Works Begins \$300,000 Expansion Project

Elmer Nooter, president of John Nooter Boiler Works Co., St. Louis, has announced a \$300,000 expansion program to increase the firm's production of fabri-



START NEW ABRASIVES PLANT: P. Joel Styffe, representing Norton Co.'s 50-year employees, breaks ground for company's new No. 7 plant at Worcester, Mass., in which vitrified grinding wheels will be made. Plant will cost \$3,500,000 and will be completed in the summer of 1948. Looking on are, left to right: Milton P. Higgins, president; Andrew B. Holmstrom, vice president and general manager of the abrasives division; Aldus C. Higgins, chairman of the executive committee

cated steel and alloy plates by more than 30 per cent.

Construction of a 25,000 sq ft addition at the rear of the company's present plant at 1401 S. Second St. has started and will be completed next fall. The facility will be divided into a 60-ft bay supporting 50-ton cranes and a 40-ft bay for 10-ton cranes. Other features include an annealing furnace, x-ray apparatus and an experimental laboratory with the latest equipment.

Paterson-Leitch Celebrates 33rd Year in Warehousing

Paterson-Leitch Co., Cleveland, is now celebrating its 33rd year in the steel warehousing field with completion of a plant addition which will increase its manufacturing space by 20 per cent.

The firm started in 1914 with one product, concrete reinforcing bars. Subsequent expansions included the warehousing of merchant bars, shapes, sheets, strips and plates in 1923, and the addition of a modern fabricating department in 1925. The company also pioneered in arc welding and now keeps a crew of 40 arc welders employed on prefabricated parts such as machine bases, truck frames, ovens, furnaces and material

handling equipment. Steel framework for astronomical observatories is another Paterson-Leitch specialty.

The two original founders, Charles J. Paterson, president, and Robert I. Leitch, treasurer, are still active in directing the company's affairs. Other officers include Wilbur J. Shenk, vice president; Rollie H. Beutel, secretary and sales manager; William J. Burkhardt, assistant treasurer and office manager; Tom H. Paterson, assistant sales manager; and Norman H. Bolz, general superintendent.

First Unit of Electronics Plant in Syracuse Opens

The first manufacturing unit of General Electric Co.'s \$25 million Electronic Park in Syracuse, N. Y., has been opened. It is said to be the world's largest radio transmitter manufacturing building.

Covering an area of 281,000 sq ft, the structure is 700 ft long and 300 ft wide. It has a total office and manufacturing space of 372,880 sq ft. Construction of the building was started in the fall of 1945. It is the first of nine units of the park to go into production while the entire division is expected to be in full production before the end of May.

BRIEFS . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Pennsylvania Flexible Metallic Tubing Co., Philadelphia, recently opened sales and warehouse facilities in Los Angeles and will inaugurate a sales and warehouse headquarters in Chicago, May 1.

—o—

Lodge & Shipley Co., Cincinnati, has appointed Price Bros. Equipment Co., Wichita, Kans., as distributor for its garden tractor in Kansas and northern Oklahoma.

—o—

Esco Engineering Corp., Cleveland, has appointed Acme-Danneman Co., New York, as national distributor for its line of drill jigs, adapter plates and component parts.

—o—

U. S. Dept. of Labor announces that there are now 2726 apprentice programs throughout the nation training 5921 workers for skilled crafts.

—o—

American Anode Inc., Akron, subsidiary of B. F. Goodrich Co., has opened a plant in East Los Angeles, Calif., for the manufacture of synthetic and crude rubber latices. Geared to produce 4 million pounds per year, the plant is the first of its kind west of the Mississippi.

—o—

Connecticut Precision Casting Co., New Canaan, Conn., has been formed by C. T. Finn and B. T. Butterworth Jr. The firm will specialize in the casting of small parts.

—o—

Brown Instrument Co., Philadelphia, manufacturer of industrial precision instruments, has opened a sales and service office in Baltimore with W. J. Law in charge.

—o—

General Electric Co., Schenectady, N.Y., has begun to install equipment for the manufacture of plastics molded parts in its factory at Decatur, Ill., recently purchased from War Assets Administration.

—o—

American Steel & Wire Co., Cleveland, subsidiary of United States Steel Corp., has declared June 4 as an "open house" day in its mills in Joliet and Waukegan, Ill.

—o—

Oldsmobile Division, Detroit, General Motors Corp., announces that it sold 3,608 cars during the first 1947 quarter, compared with 69,854 sold during the first quarter of 1941.

—o—

United States Rubber Co., New

York, reports net sales in the first quarter of 1947 as averaging almost \$50 million per month, which is 40 per cent ahead of the same period last year.

—o—

Monsanto Chemical Co., St. Louis, has opened a plant at Springfield, Mass., for manufacture of a textile-treating chemical. The facility will have a yearly output capable of processing 50 million yards of fabric.

—o—

Fairbanks, Morse & Co., Chicago, has received orders for diesel locomotives totaling 32,000 hp from Kansas City Southern Lines, Milwaukee Road, Monon Route, Chicago & North Western, Union Pacific, New York Central and others.

—o—

Henry J. Morton Associates Inc., Detroit, has licensed Robert Mitchell Co. Ltd., Montreal, Canada, to manufacture and sell its portable electric radiator in Canada.

—o—

Leslie Co., Lyndhurst, N. J., manufacturer of regulators, controllers and whistles, has appointed the following sales agents: Plant Equipment Inc., Minneapolis; Fluid Equipment Co., Dallas, Tex.; Avery M. Walsh & Sons, Albany, N. Y.

—o—

Consolidated Machine Tool Corp., Rochester, N. Y., has acquired the Machine Tool Division of William Sellers & Co., Philadelphia. Entire manufacturing and sales facilities of the Sellers firm will be moved to Rochester, and it will bear the name of William Sellers & Co. Division, Consolidated Machine Tool Corp.

—o—

Prucoat Laboratories Inc., Cambridge, Mass., manufacturer of protective coatings for metal, masonry and wood, has moved its offices to 135 S. La Salle St.

—o—

General American Transportation Corp., Chicago, manufacturer of processing equipment, has acquired L. R. Christie Co., New York, builder of industrial dryers, calcinators and coolers. The Christie firm will continue to manufacture the same products, and increased plant capacity is planned.

—o—

Vacuum Cleaner Manufacturers' Association, Cleveland, announces factory sales of household vacuum cleaners totaled 320,047 in March, 17 per cent ahead of the 272,927 sold in February

and 142 per cent above the figure for March, 1946.

—o—

Service Spring Co., Indianapolis, manufacturer of springs for automobiles and trucks, has designated Borg-Warner International Corp., Chicago, as its export representative.

—o—

War Assets Administration, Chicago, announces that hoists, cranes and conveyor equipment, whose acquisition cost to the government was \$116,000, will go on sale continuously, observing the regular priorities, on May 7.

—o—

Ampeo Metal Inc., Milwaukee, has named John C. Fitzpatrick Co., Toronto, as sales agent in Ontario and Anstice Co., Rochester, N. Y., as agent for western New York.

—o—

Bunell Machine & Tool Co., Cleveland, has expanded its technical and machine facilities for the designing and building to customer specifications of machines, tools and dies for manufacturers of farm equipment.

—o—

Osborn Mfg. Co., Cleveland, recently honored 11 employees who had reached their twentieth year of service with the company. Osborn has over 100 employees with 20 years of service and 20 employees with more than 30.

—o—

Goodyear Tire & Rubber Co., Akron, has added the 425,000 cu ft "Puritan" to its blimp fleet. Purchased last year from War Assets Administration, the blimp will be used for advertising purposes.

—o—

American Standards Association, New York, is now distributing its "Basic Graphical Symbols for Electric Apparatus," a standard covering symbols used in drawings in the electrical field.

—o—

Colonial Radio Corp., Buffalo, subsidiary of Sylvania Electric Products Inc., has opened a plant at Riverside, Calif., for production of small radio sets.

—o—

National Oil Products Co., Harrison, N. J., has changed its name to Nopco Chemical Co. in order to identify the company more readily with the chemical industry.

—o—

Globe Trade Research, Chicago, has been formed to provide a service for manufacturers in export market analysis and counsel.

—o—

Raybestos-Manhattan Inc., Passaic, N.J., maker of industrial rubber products, has opened offices and warehouse facilities in San Francisco.

The Business Trend

Steady Pace Maintained By Industrial Activity

INDUSTRIAL activity continued steady in the week ended Apr. 19 with the result STEEL's industrial production index registered 157 per cent of the 1936-1939 average. In the preceding two weeks the index stood at 156 per cent. Postwar high point had been 164 per cent for the week ended Mar. 22.

Brightening the outlook for continuation of high levels of industrial activity is the agreement on a new wage contract by the steelworkers and the U. S. Steel Corp. In recent weeks, steel ingot production has been running around 96 per cent of capacity. Except for the first week of 1947, ingot output each week this year has been at 90 per cent or better of capacity. Nevertheless, pent-up demand for steel products, particularly sheets, has been so great that the balancing of demand and supply is still some months in the future.

AUTOS—The nation's biggest user of steel, the automobile industry, showed a production increase in the week ended Apr. 19, despite a number of handicaps. That week's output is estimated at 103,148 passenger cars, trucks and busses, compared with 97,893 in the preceding week. Postwar high had been 108,472 in the week ended Mar. 22.

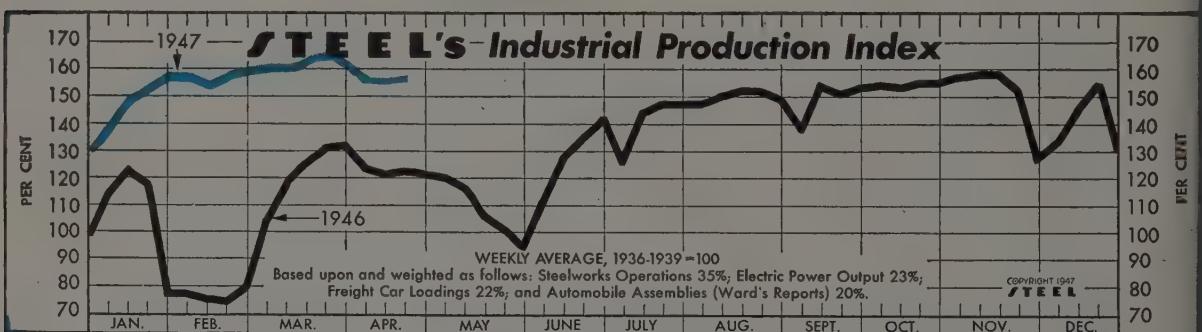
COAL—With an increasing number of miners returning to work in the week ended Apr. 12, output of bituminous

coal that week rose to an estimated 7,045,000 net tons, compared with 3,800,000 net tons in the preceding week. Despite the miners' recent work stoppage, total output this year is 6.2 per cent ahead of that for the corresponding period of last year, for last year's production too had been held down by a miners' strike.

ELECTRICITY—Advent of spring and shorter nights has been accompanied by a downturn in distribution of electricity. Output between Mar. 1 and Apr. 12 declined successively each week. However, electricity production in each of the weeks thus far in 1947 exceeds that for the corresponding week of 1946, with the result total output this year is 19 per cent ahead of that for the like period of last year.

PRICES—For the second consecutive week the wholesale price index of the U. S. Bureau of Labor Statistics has declined, lowering the index for the week ended Apr. 12 to 148.1 per cent of the 1926 average, compared with 148.8 per cent in the week ended Apr. 5 and the post-war high of 149.4 in the week ended Mar. 29. Greatest decreases were in farm products, foods, and miscellaneous commodities.

CONSTRUCTION—Investment commitments for construction in the 37 states east of the Rocky mountains set in the first three months of 1947 a first-quarter record by totaling \$1,610,580,000, according to the F. W. Dodge Corp. The record is attributed to a high volume of residential contract letting, the first quarter's total being \$748,691,000 against the previous high of \$707,366,000 in the first quarter of 1928.



The Index (see chart above): Latest Week (preliminary) 157 Previous Week 156 Month Ago 164 Year Ago 125

FIGURES THIS WEEK

INDUSTRY

	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	95.5	96.5	96.5	74.5
Electric Power Distributed (million kilowatt hours)	4,660	4,620	4,759	3,987
Bituminous Coal Production (daily av.—1000 tons)	1,174	633	2,191	119
Petroleum Production (daily av.—1000 bbls.)	4,912	4,913	4,862	4,686
Construction Volume (ENR—Unit \$1,000,000)	\$110.1	\$125.2	\$109.1	\$154.7
Automobile and Truck Output (Ward's—number units)	103,148	97,893	108,472	57,565

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

TRADE

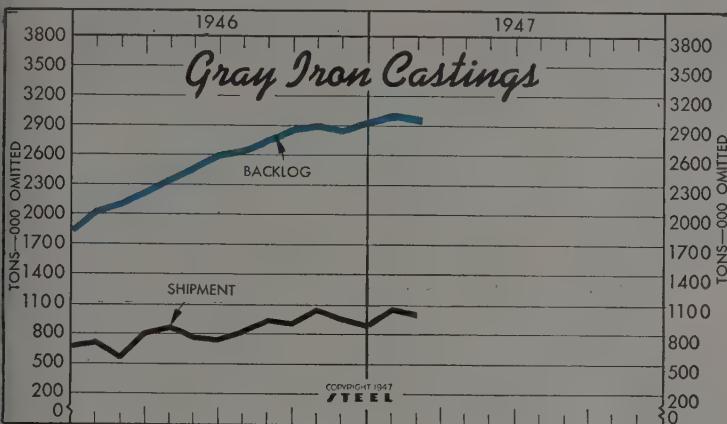
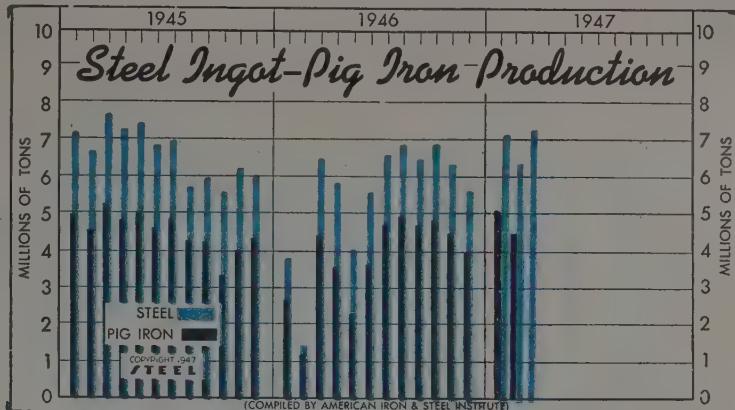
Freight Carloadings (unit—1000 cars)	800†	758	844	651
Business Failures (Dun & Bradstreet, number)	68	59	47	16
Money in Circulation (in millions of dollars)‡	\$28,163	\$28,250	\$28,242	\$27,948
Department Store Sales (change from like wk. a yr. ago)‡	-6%	+17%	+10%	+81

* Preliminary. † Federal Reserve Board.

Iron, Steel Production (Net Tons—000 omitted)

	Steel Ingots		Pig Iron		
	1947	1946	1945	1947	1946
Jan.	7,213	3,872	7,204	5,071	2,645
Feb.	6,422	1,393	6,653	4,550	1,148
Mar.	7,285	6,507	7,706	.....	4,424
Apr.	.....	5,860	7,290	.....	3,614
May.	4,072	7,450	.....	2,275	.....
June	5,625	6,841	.....	3,682	.....
July	6,610	6,986	.....	4,705	.....
Aug.	6,887	5,735	.....	4,898	.....
Sept.	6,518	5,982	.....	4,687	.....
Oct.	6,910	5,597	.....	4,815	.....
Nov.	6,409	6,200	.....	4,435	.....
Dec.	5,701	6,058	.....	3,992	.....
Total	.....	66,364	79,702	.....	*45,379

* Adjusted.

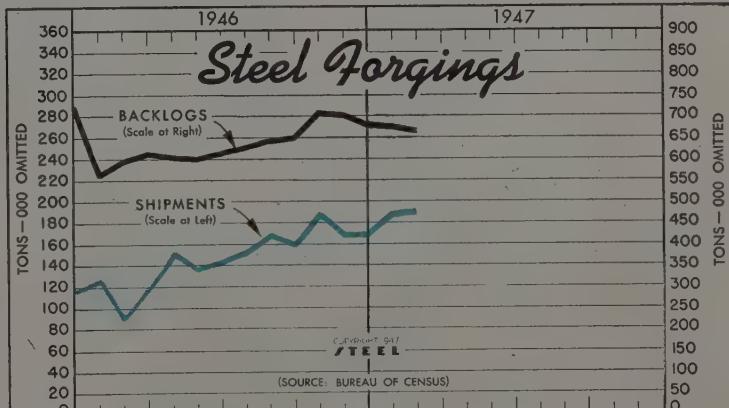


Gray Iron Castings

(U. S. Bureau of Census)

	Shipments		Backlogs*	
	1947	1946	1947	1946
Jan.	1,056	706	2,986	2,077
Feb.	994	541	2,949	2,153
Mar.	796	.....	.....	2,265
Apr.	857	.....	.....	2,378
May	757	.....	.....	2,492
June	735	.....	.....	2,633
July	811	.....	.....	2,669
Aug.	945	.....	.....	2,786
Sept.	914	.....	.....	2,882
Oct.	1,051	.....	.....	2,916
Nov.	964	.....	.....	2,888
Dec.	889	.....	.....	2,952
Mo. Ave.	830	.....	.....	2,591

* Unfilled orders for sale to the trade.



(SOURCE: BUREAU OF CENSUS)

Steel Forgings

Tons—000 omitted

	Shipments		Unfilled orders*		Consumption	
	1947	1946	1947	1946	1947	1946
Jan.	191	180	675	561	285	182
Feb.	192	93	668	596	284	125
Mar.	123	.....	612	.....	164	.....
Apr.	155	.....	604	.....	208	.....
May	139	.....	599	.....	197	.....
June	147	.....	610	.....	204	.....
July	154	.....	624	.....	214	.....
Aug.	171	.....	639	.....	243	.....
Sept.	162	.....	648	.....	233	.....
Oct.	189	.....	707	.....	271	.....
Nov.	171	.....	700	.....	238	.....
Dec.	172	.....	677	.....	244	.....

* Forgings for sale.

FINANCE

Bank Clearings (Dun & Bradstreet—millions)

	Latest Period*	Prior Week	Month Ago	Year Ago
Federal Gross Debt (billions)	\$258.0	\$258.0	\$258.9	\$274.3
Bond Volume, NYSE (millions)	23.9	18.9	16.7	\$19.6
Stocks Sales, NYSE (thousands)	6,966	4,664	3,739	6,430
Loans and Investments (billions)†	\$54.9	\$54.8	\$55.6	\$65.3
United States Govt. Obligations Held (millions)†	\$34,296	\$34,151	\$35,300	\$46,689

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average

All Commodities†	\$69.82	\$69.82	\$69.82	\$63.54
Industrial Raw Materials†	148.1	148.8	148.3	109.3
Manufactured Products†	163.4	164.0	164.1	122.8
	142.0	142.8	142.1	104.8

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry



CHARLES E. COYLE



C. R. POWERS



VERE B. BROWNE

Charles E. Coyle has been appointed general traffic manager, Otis Elevator Co., New York. He succeeds George W. Shannon, who has retired after 41 years with the firm. Mr. Coyle joined Otis Elevator Co. in 1920, and was formerly assistant general traffic manager.

—o—

Henry S. Elder has been named vice president, Titeflex Inc., Newark, N. J. Prior to joining Titeflex, Mr. Elder had been treasurer and a director of National Fireworks Inc., West Hanover, Mass.

—o—

Isaac Harter, formerly vice president and director, the Babcock & Wilcox Co., New York, has been elected chairman of the board of the Babcock & Wilcox Tube Co., Beaver Falls, Pa. He joined Babcock & Wilcox Co. in 1907, and has been a vice president and director since 1924. He also has served as executive vice president and director of the Tube company, in which position P. D. White succeeds him as executive vice president. George J. Hartnett Sr. has been named general superintendent of the Babcock & Wilcox Co., with headquarters at the Barberton, O., Works. C. H. Gay has been promoted from assistant superintendent to superintendent, and George J. Hartnett Jr. has been named assistant superintendent.

—o—

Louis B. Wackman has been elected a director and president, Southline Metal Products Co., Houston, Tex. He had formerly been president and treasurer of Wackman Welded Ware Co., St. Louis, and later an executive advisor and consultant to J & L Steel Barrel Co., subsidiary of Jones & Laughlin Steel Corp., Pittsburgh.

—o—

Howard M. Dirks has been elected vice president and personnel director of Car-

rier Corp., Syracuse, N. Y. He recently resigned his position as director of industrial relations, Perfect Circle Corp., Hagerstown, Ind.

—o—

C. R. Powers has been appointed procurement and engineering manager of the Dearborn Motors Corp., Detroit. He will direct procurement and engineering of the complete line of farm implements which Dearborn Motors will distribute with the Ford tractor after June 30.

—o—

S. Horace Disston, president, Henry Disston & Sons Inc., Philadelphia, has been elected chairman of the board. He has been associated with the company for 48 years. He is succeeded as president by Jacob S. Disston Jr., who has been vice president of the company.

—o—

C. D. Clawson has been elected president of Ferro Enamel Corp., Cleveland, succeeding Robert A. Weaver, who has been elected chairman of the board. Sterling Newell has retired as chairman but continues a director of the company. James D. Henry has been elected vice chairman. Mr. Clawson, formerly vice president in charge of sales and research, has been associated with the company for 17 years, several of which were spent in South America where he started plants in Sao Paulo, Brazil, and at Buenos Aires. F. S. Markert has been promoted to executive vice president and general manager, Dr. G. H. McIntyre, a vice president, G. W. Wallace, treasurer, and G. E. Weber, comptroller.

—o—

Clarence L. Lesmer, Telling-Belle Vernon Co., Cleveland, has been elected president of the Purchasing Agents Association of Cleveland. Frank J. DeCrane, Lamson & Sessions Co., Cleveland, has been re-elected first vice pres-

ident. Mr. Lesmer succeeds Thomas D. Hudson, American Steel & Wire Co., U. S. Steel subsidiary, who has been elected national director of the association. George Fay has been re-elected second vice president, Al Kostulski, secretary-treasurer, and Ed Pike, a member of the board of trustees.

—o—

Vere B. Browne has been named research consultant to Heppenstall Co., Pittsburgh, and Bridgeport, Conn. He became an honorary vice president when he retired in January as vice president and technical director of Allegheny Ludlum Steel Corp., Pittsburgh, and continues as research consultant of that organization. Lloyd R. Cooper, acting director of Heppenstall research, has been placed in charge of the management of the company's newly opened research laboratory, and will direct the Heppenstall research program.

—o—

Richard F. V. Stanton has been elected vice president, Niles-Bement-Pond Co., Flemington, N. J. He will also continue in his present position of assistant machine tool sales manager in the Pratt & Whitney Division.

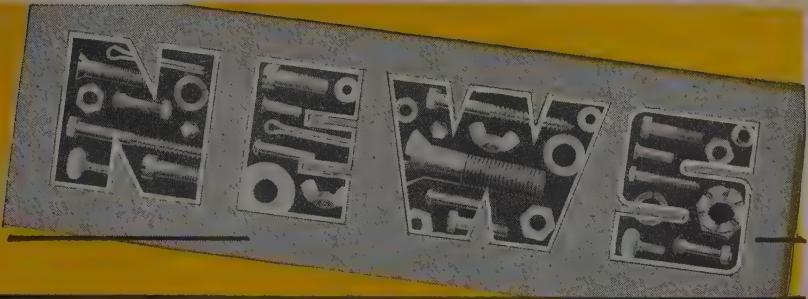
—o—

Walter Berg has been elected vice president and member of the board of directors, Dravo Corp., Pittsburgh. He had been associated with the company for many years in engineering and sales work. In 1938 he became manager of the power department of the corporation's Machinery Division, and in 1946 was named general manager of the Machinery Division, which position he will continue to hold in addition to his new duties.

—o—

John P. Mosling, assistant sales manager, Oshkosh Motor Truck Inc., Osh-

HARPER fastening



"MIRACLE" DRUG TOUGH ON METAL



The production of Streptomycin puts severe test on metal containers and equipment.

To produce only a few hundred pounds of finished Streptomycin—a successor to penicillin in many uses—requires processing thousands of tons of raw material and millions of gallons of water. Various corrosive broths and liquors must be continuously filtered thru specially designed filters . . . some built of stainless steel, some of rubber protected carbon steel and others of Inconel. One leading manufacturer of all such filters uses Harper Non-Ferrous and Stainless Steel fastenings for corrosion resistance and strength.

MONEL OR STAINLESS RIVETS?

Monel rivets are used to fasten the stainless steel plates in a cylindrical commercial laundry washer because they have desirable strength and resistance

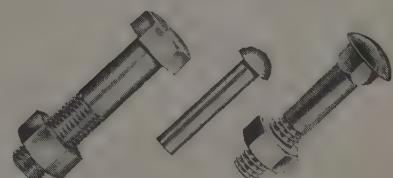
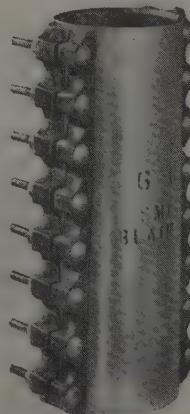


corrosion from the alkaline soap and bleaching agents. At the same time they are easier to work, in this case, than stainless steel rivets which normally would have been specified for the job. Problems these are a Harper specialty.

BRONZE BOLTS REDUCE REPAIRS

Water system pipe lines present a constant maintenance problem in most cities. Iron pipe corrosion, temperature changes, vegetable growths and many other stresses and strains cause leaks which must be plugged quickly and efficiently.

One widely used repair device, consisting in part of pipe sections and sleeves, is held in place by Harper bronze bolts which provide strength, rust and corrosion resistance, ready removability and reusability at low cost.



Write for summarized catalog listing many of the 5200 different types and sizes of Everlasting Fastenings carried in stock.

The H. M. HARPER COMPANY
2646 FLETCHER STREET
CHICAGO 18, ILLINOIS

Branch Offices—New York City, Philadelphia, Los Angeles, Milwaukee, Cincinnati, Dallas.



HARPER SPECIALIZES IN EVERLASTING FASTENINGS

kosh, Wis., has been promoted to sales manager of the company. H. J. Allender, former purchasing agent, has been appointed manager of the Manufacturing Division. Lawrence R. Jarvey has been appointed purchasing agent succeeding Mr. Allender.

—o—

John W. Colling has been appointed controller and assistant general manager, Basic Manufacturers' Sales Corp., New York, and George R. Klaus, assistant manager of production planning.

—o—

Two new vice presidents elected by Raybestos-Manhattan Inc., Passaic, N. J., are John H. Matthews, named vice president in charge of the Manhattan Rubber Division, Passaic, and O. H. Cilley, assistant general manager of the United States Asbestos Division, Manheim, Pa. A. F. Heinsohn, general manager of General Asbestos and Rubber Division, North Charleston, S. C., has been placed on the board of directors of the corporation.

—o—

L. S. Martz, formerly assistant to the president of Micromatic Hone Corp., Detroit, has joined Marvin Hahn Advertising, Detroit, as account executive.

—o—

Two new directors elected to the board of Arthur G. McKee & Co., Cleveland, are H. R. Moorhouse, secretary, and James Krumhansl, treasurer of the company.

—o—

Albert Goldman, vice president and general manager of the Atlantic Mfg. Co., Philadelphia, has been elected president of the Philadelphia Tool & Die Manufacturers Association.

—o—

Emmett W. MacCorkle Jr. has been appointed Portland, Oreg., district manager, Air Reduction Sales Co., New York. After four years' service in the U. S. Navy, he returned to Airco as assistant manager of the gas sales department, New York office.

—o—

Herman Van Fleet Jr. has been appointed manager of the New England district of Air Reduction Sales Co., New York. He will maintain headquarters in Boston. In addition to his sales function, Mr. Van Fleet will be in charge of Air Reduction plants at Boston, South Portland, Me., and Central Falls, R. I.

—o—

Kenneth D. Bryan has been appointed general superintendent of the Braeburn Alloy Steel Corp., Braeburn, Pa., and W. Rex Reiter has been appointed assistant general superintendent.

—o—

Thomas M. Linville has been named

staff assistant to E. E. Johnson, manager of engineering, Apparatus Department, General Electric Co., Schenectady, N. Y.

—o—

Harold Myers has joined the Perfect Circle Corp., Hagerstown, Ind., as a member of the central staff. He will be associated with the chief engineer of the Manufacturing Division. George Myers has been promoted to assistant plant manager of the Hagerstown plant. He was formerly factory superintendent. As a result of the resignation of Howard M. Dirks, director of industrial relations, the corporation has reorganized the industrial relations office and divided the responsibilities of Mr. Dirks among top executives, plant managers, and plant personnel managers. Irving Lacy, formerly assistant to Mr. Dirks, has been appointed personnel assistant to the president of the corporation. Kent Morse, wage administration manager, and O. M. Aders, industrial education manager, have been reassigned to the central staff of the Manufacturing Division.

—o—

Roy E. Fortner and Albert M. Pearson have been appointed assistant credit managers of the Tennessee Coal, Iron & Railroad Co., Birmingham. Mr. Fortner will have charge of credit matters in the eastern area, and Mr. Pearson in the western area.

—o—

Fred E. Russell has been appointed controller for the Central Engineering Department of Sylvania Electric Products Inc., New York. He joined the company in 1943 as assistant to the general manager of the Lamp Division, and was recently assistant to the vice president in charge of engineering.

—o—

R. C. McDonald has been appointed production manager, Indian Motorcycle Co., Springfield, Mass. He had been previously with Cummins Engine Co., Columbus, Ind. L. J. Kinder has been

named factory manager of the company. He had been previously associated with Fairchild Aircraft Corp., in Burlington, N. C.

—o—

Raymond M. Gordon, formerly a sales engineer for Clark Supply Co. Inc., Milwaukee, has been appointed midwest representative for pump sales, Oberdorfer Foundries Inc., Syracuse, N. Y.

—o—

Robert A. Ewens has been elected manager of the Wisconsin Manufacturers Association, Milwaukee. He succeeds George F. Kull as chief administrative officer of the organization. Joseph C. Ford, president, Celon Co., Madison Wis., was elected a director of the association to succeed J. D. Mylrea, who resigned.

—o—

Paul R. Fields has been appointed purchasing agent, Danly Machine Specialties Inc., Chicago. He had previously been associated with F. L. Jacobs Co., Detroit, and the Dodge Division of Chrysler Corp., Detroit.

—o—

L. M. Seiberling, sales manager of the Seiberling Rubber Co., Barberton, O., has been elected a director of the company to succeed his father, the late C. W. Seiberling.

—o—

Melvin E. Iten has been appointed freight traffic manager, and Harold T. Hale, passenger traffic manager of Monsanto Chemical Co., St. Louis.

—o—

John F. Marquitz has been appointed assistant manager of the Railroad Division, Fairbanks, Morse & Co., Chicago. He succeeds John S. King, recently appointed manager of the company's Chicago branch.

—o—

Thomas A. Brown has been appointed division superintendent, secondary mills



FRED E. RUSSELL



JOHN F. MARQUITZ

"Arc Booster" Simplifies AC Welding

Lincoln Electric announces new industrial type AC welder

A NEW heavy-duty transformer type welder, the "Fleet-Arc" has been introduced by The Lincoln Electric Company which improves AC welding by affording greater ease of arc striking, deeper penetration at the start, wider range of output, greater economy of operation and greater safety. It is applicable to a wide range of applications throughout industry.

A feature known as the "Arc Booster" gives the arc a burst of current the instant the electrode touches the work, starting the arc automatically. The current then returns in a fraction of a second to the amount set for the job. A selector switch provides adjustment of the booster current for any degree of arc striking intensity to suit the job.

Improves Penetration at Start

To improve penetration at the start of a bead, the "Arc Booster" of this new welder can be set to dig in with deep penetration. This is especially important for tack welds and short beads.



Improves Arc Characteristics

The welder has a reactor type of control which is a free circuit, designed for high responsiveness to changing arc conditions. It is separate from the main transformer which is designed for high efficiency. This design gives high arc sensitivity for maximum ease and speed of welding under all conditions; it makes possible an exceptionally wide range of output; and it improves power efficiency.

Current Adjustment is Continuous

The rotating reactor control provides step-less, smooth, accurate adjustment of welding current over the entire range of the welder. The operator simply turns a hand wheel. A double reduction chain drive makes it easy to turn the control and requires a minimum number of turns of the handle to cover the range. The amperage is indicated on a dial on the front of the welder.

The reactor current control is held in position by rugged cone brakes, preventing vibration and wear of the control mechanism.

Increases Safety

The open circuit voltage of the "Fleet-Arc" AC welders never exceeds 63 to 70 volts (depending on welder capacity). This eliminates the hazards of the high open circuit voltages which are used in the usual AC welders to improve arc striking.

Reduces Idle Power Consumption

The independent control circuit eliminates the need for high open circuit voltage, contributes to higher power factor. By reducing amount of condensers needed as much as 66%, this new welder minimizes idle power input.

Is Completely Self-Protected

A thermostatic device protects the windings of the welder from damage due to overheating, opening the welder's magnetic starter under such conditions. This feature permits the welder to be used at high current values for sustained periods without danger of burn-out.

Immediate Delivery

The new welders are available from stock in ratings of 200, 300 and 500 amperes. Complete information on the "Fleet-Arc" AC Welders is given in Bul. 366 which may be had by writing The Lincoln Electric Company, Dept. 155, Cleveland 1, Ohio.

Advertisement

Youngstown district, Carnegie-Illinois Steel Corp., U. S. Steel subsidiary. He succeeds Harry J. Baugh, who has retired after 46 years with Carnegie-Illinois, in Youngstown and Pittsburgh district plants.

—o—
Ward Jenks has been appointed manager of the forge blanks department, Midland Works, the Pittsburgh Crucible Division of Crucible Steel Co. of America. In addition to his new assignment, Mr. Jenks will continue to direct the sale of Rollomatic products, with offices both at Midland and Detroit.

—o—
J. C. Peirce, formerly sales manager and chief foundry engineer, Hydro Blast Corp., Chicago, has joined the Pangborn Corp., Hagerstown, Md. He will specialize in the application and development of the Pangborn hydrosand blast and core knockout installations.

—o—
Richard P. Harris has been appointed factory manager of the electroforming department of the United States Rubber Co., at Detroit. He was formerly assistant to the factory manager, Chance Vought Division, United Aircraft Corp., Stratford, Conn.

—o—
W. N. Foster, divisional district representative in the Eastern Division of the Caterpillar Tractor Co., Peoria, Ill., has been promoted to assistant sales manager of that division. He succeeds C. A. Barabe, who is starting a six-month leave of absence.

—o—
James B. Jamison has been named president of the Standard Steel Specialty Co., Beaver Falls, Pa., succeeding the late Ernest J. Wagner. Mr. Jamison has been with the company since its organization in 1925, first as secretary and sales manager, and in more recent years, has been vice president and director of sales. Due to a typographical error, it was incorrectly reported in STEEL, page 82, Apr. 21 issue, that Mr. Jamison had been named president and treasurer of the Superior Co., Beaver Falls, Pa.

—o—
Frederick C. Hughes has retired as vice president of General Motors Corp., Detroit, and general manager of its New Departure Division, Bristol, Conn. He will be succeeded as general manager of the division by Milton L. Gearing, who has been plant manager for New Departure at Meriden, Conn.

—o—
Henry A. Roemer Jr. and G. Findley Griffiths have been named vice presidents of Sharon Steel Corp., Sharon, Pa. Mr. Griffiths has also been named general manager of sales. A. J. Watson has been re-elected secretary, and has also been

named treasurer. E. T. Sproull has been named president of the Brainard Steel Division of the company, R. G. Glosser, assistant treasurer, and L. E. Moore, auditor of the division.

—o—
Columbia Steel Co., West Coast subsidiary of United States Steel Corp., has announced the following appointments in its new sheet and tin mill at the Pittsburgh, Calif., plant: D. E. Rice, division superintendent; D. W. Lasell, assistant division superintendent; C. C. Morgan, superintendent of the cold reduction department; J. P. Newman, superintendent of the sheet finishing department; J. H. Clark, superintendent of the tin finishing department; W. L. Clark, general foreman of the cold reduction department; Melvin Rush, general foreman of the hot dip tinning department; and George Jedenoff, general foreman of the electrolytic tinning department.

—o—
John J. Prohaska, general sales manager, Cleveland Automatic Machine Co., Cincinnati, has been elected vice president of the company, and will continue to direct the company's sales activities as general manager. Nicholas Peay, former assistant to the president, and Richard E. LeBlond, president of R. K. LeBlond Machine Tool Co., Cincinnati, have also been elected vice presidents of the company. Frank Stenger, former assistant secretary, has been elected secretary and assistant treasurer.

—o—
Charles G. Purnell has been appointed representative in the Market Development Division, Carnegie-Illinois Steel Corp., U. S. Steel subsidiary. He had served as a metallurgical contact representative. In his new position he will be responsible for the expansion of new as well as old uses for steel in the indus-

trial machinery and equipment industry, and for expanding development work in connection with natural resources.

—o—
Edward G. Mansfield has been appointed field service representative for Optimus Detergents Co., Matawan, N.J.

—o—
R. M. Moore has been appointed general sales manager, Pittsburgh Coke & Chemical Co., Pittsburgh. He has been associated with the company for several years in charge of the activated carbon program, as well as assisting in other operations of the company. Alan S. Evans has been appointed manager of the Chemical Sales Division.

—o—
George L. Brunner Sr. has retired from the management of the Brunner Mfg. Co., Utica, N. Y., and A. G. Zumbrun has been named chairman of the board and managing director. G. L. Brunner Jr. continues as president. Alfred D. Sullivan has been named chief engineer.

—o—
Dana L. Tyler has joined the P. C. Lissenden Construction Corp., West Palm Beach, Fla., as secretary and assistant treasurer. He resigned as secretary and assistant treasurer of the Utica Drop Forge & Tool Co., Utica, N. Y.

—o—
Fletcher W. Rockwell has been elected chairman of the board of National Lead Co., New York, and Joseph A. Martino has been elected president of the company. Mr. Rockwell, formerly president, has been associated with the company for 50 years. Mr. Martino, formerly executive vice president, joined the company in 1916.

—o—
William B. Gero has been appointed assistant to the vice president of the Bloomfield, N. J., Lamp Division, West-



JOSEPH PFEIFFER

Appointed director of purchases for Chrysler Corp., Detroit. Noted in STEEL, Apr. 21 issue, p. 85



G. W. CHRISTOPHER

Appointed manager of standard pipe sales, Youngstown Sheet & Tube Co., Youngstown. Noted in STEEL, Apr. 14 issue, p. 80



CHARLES H. CECIL

Appointed manager of sales, Pittsburgh district, Bethlehem Steel Co., Bethlehem, Pa. Noted in STEEL, Apr. 21 issue, p. 84



R. H. DAISLEY

Elected vice president and director of manufacturing, Eaton Mfg. Co., Cleveland. Noted in STEEL, Apr. 21 issue, p. 80



H. J. McGINN

Elected vice president and director of sales, Eaton Mfg. Co., Cleveland. Noted in STEEL, Apr. 21 issue, p. 80

ghouse Electric Corp., New York, and Theodore C. Monk has been appointed manager of manufacturing.

—o—

Dennis F. McCarthy has been named manager of the new Tubular Goods Division of the A. O. Smith Corp., Milwaukee.

—o—

Walter A. Jayme has been appointed

assistant general superintendent of the Gary, Ind., Works of the National Tube Co., subsidiary of United States Steel Corp., Chicago.

—o—

Dr. Eugene M. McColm has been appointed technical director of the Plantation Division, United States Rubber Co., New York. He joined the company in 1927 as a chemist with the Plantation

Division located in the Far East. After two years' service with the Navy he returned to the Naugatuck Chemical Division of the company.

—o—

Mildred A. FitzPatrick, secretary in the Detroit office of Vanadium Corp. of America, New York, will celebrate her 25th anniversary with the company on May 1.

OBITUARIES . . .

William A. Ross, 68, president, Columbia Steel Co., West Coast subsidiary of United States Steel Corp., died in San Francisco, Apr. 19. He held various executive positions with the Pacific Coast department of United States Steel Products Co., also a U. S. Steel subsidiary, before leaving to join Columbia Steel when the Columbia Steel Corp. was acquired by U. S. Steel in 1930. He was elected president in 1939.

—o—

Simon Patino, 87, president, Patino Mines & Enterprises Consolidated Inc., New York, died Apr. 20. He organized Bolivian tin mines into a corporation in 1924 and had interests in British and Dutch tin corporations in Malaya and East Indies.

—o—

Maurice W. Randall, retired senior vice president and a director of the Air Reduction Co. Inc., New York, died recently. He served at one time as president of Pure Carbonic Inc., and the Ohio Chemical & Mfg. Co., subsidiaries of Air Reduction.

—o—

Ell W. Foster, 84, director and former president of the Foster Wheeler Corp., New York, died Apr. 20. In 1900 Mr. Foster founded the Power

Specialty Co., now inactive, and was its president for 27 years.

—o—

Fred A. Harlon, 58, vice president, Weirton Steel Co., Weirton, W. Va., and a director of National Association of Manufacturers, died Apr. 19. He had been associated with the company since 1912.

—o—

W. B. Haislup, vice president, Diamond Chain Co. Inc., Indianapolis, died Apr. 11.

—o—

John A. Payne, 47, president, Consolidated Coppermines Corp., New York,



WILLIAM A. ROSS

died Apr. 18. He had been chairman of the board of Titan Metal Mfg. Co., Bellefonte, Pa.

—o—

Paul W. Cherry, 46, inventor of the Cherry rivet, manufactured by the Cherry Rivet Co., Los Angeles, died Apr. 18.

—o—

W. N. Spires, Penn Metal Co. Inc., Parkersburg, W. Va., recently died at Dallas, Tex., where he had been district sales manager of the company.

—o—

Rogers A. Fiske, 56, general sales manager, Bryant Machinery & Engineering Co., Chicago, died Apr. 16 in Santa Fe, N. Mex.

—o—

Bernard S. Hallberg, 55, Chicago district sales manager, Trumbull Electric Mfg. Co., Plainville, Conn., subsidiary of General Electric Co., died Apr. 15.

—o—

George B. Pillar, 72, a founder and past president, Milwaukee Forge & Machine Co., died recently.

—o—

Charles H. M. Atkins, 86, former president, Cincinnati Planer Co., and Acme Machine Tool Co., Cincinnati, died Apr. 14.

—o—

A. G. Ladrach, president of the Magnetic Gauge Co., Akron, died recently.

Centrifugal Casting

COPPER-SPUN

INVENTION of the induction motor was a major factor in the early change from direct to alternating current for driving electric motors. Since that time, the squirrel cage type of induction motor has passed through a natural evolutionary development. This particularly applies to the design, construction, and manufacturing technique of the squirrel cage winding.

The squirrel cage is the simplest of all windings, yet it must carry many thousands of amperes at low voltage and must be rugged in construction for both mechanical and electrical reasons.

Aluminum or white metal alloys have been used for one-piece squirrel cage windings with a variety of processing methods, since the difficulties in manufacture were not unduly restrictive with low melting point metals. These processes, however, do not all produce the maximum in physical characteristics or electrical conductivity. It is our experience that centrifugal casting is a preferred process from the standpoint of grain structure and casting porosity. This is verified by improvements made in cen-

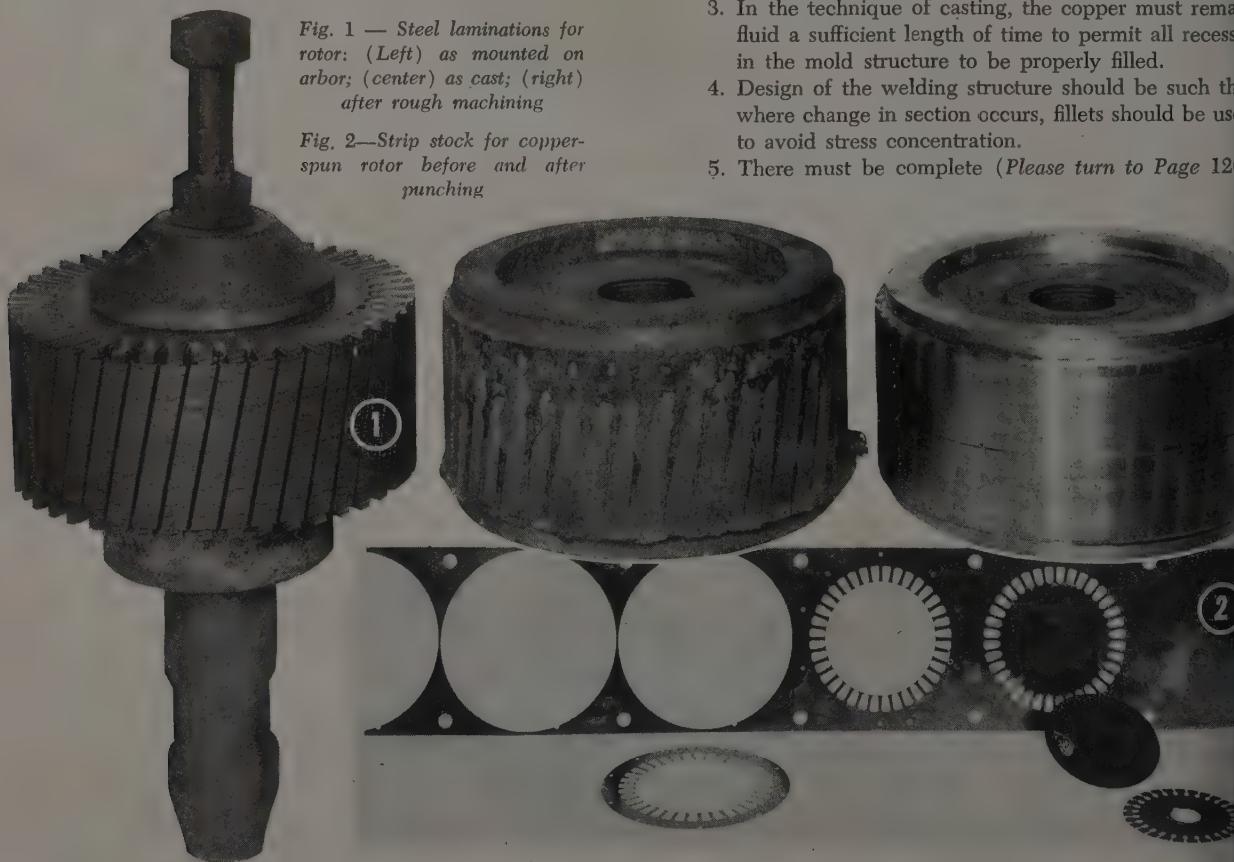
trifugal casting of iron and steel to obtain a tough, long wearing structure. A case in point is that of brake drums for automobiles.

Successful centrifugal casting of high temperature metals such as copper into rotors for induction motors is the result of solving a number of manufacturing problems involving the following basic requirements:

1. The laminated steel cores must be stacked and held under pressure in order to produce satisfactory slot recesses for the squirrel cage winding.
2. Casting pressures must be sufficiently high to produce a dense, nonporous structure of high conductivity and high strength. One of the advantages of centrifugal casting is the fact pressure is easily controlled by adjustment of speed.
3. In the technique of casting, the copper must remain fluid a sufficient length of time to permit all recesses in the mold structure to be properly filled.
4. Design of the welding structure should be such that where change in section occurs, fillets should be used to avoid stress concentration.
5. There must be complete (Please turn to Page 126)

Fig. 1 — Steel laminations for rotor: (Left) as mounted on arbor; (center) as cast; (right) after rough machining

Fig. 2—Strip stock for copper-spun rotor before and after punching



ROTOR

SPINNING

By G. A. ANDERSON
Director of Engineering
Fairbanks, Morse & Co.,
Beloit, Wis.

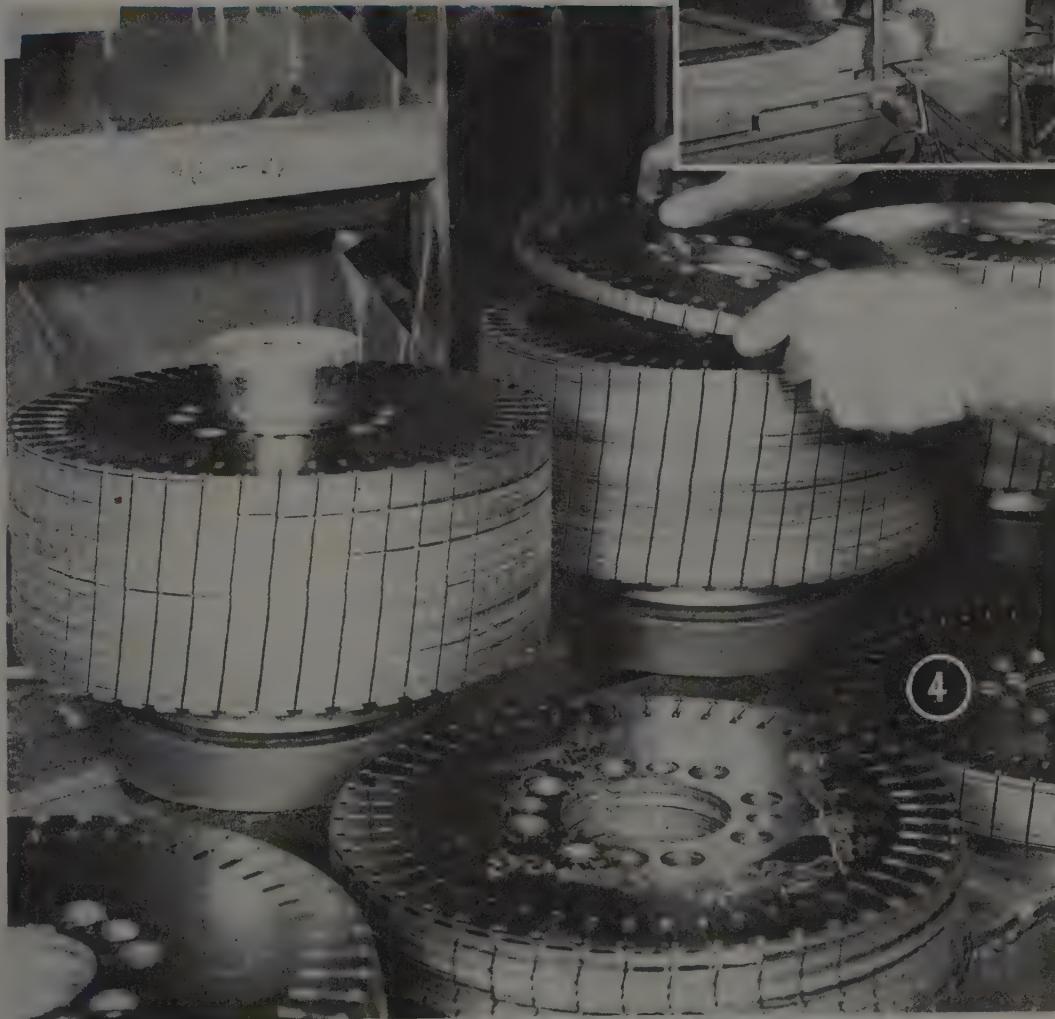


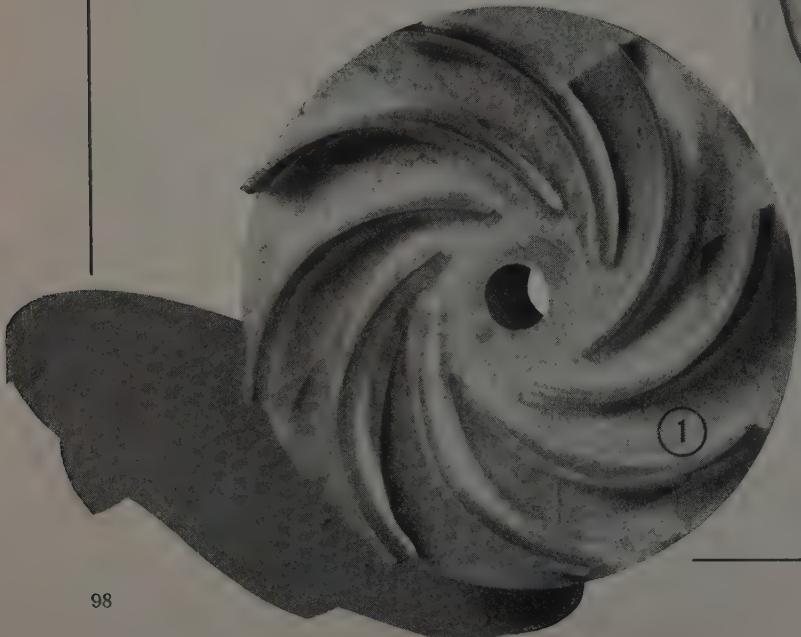
Fig. 3—Pouring molten copper through pouring hood and into core mold during spinning. Installation shown is at company's Beloit Works

Fig. 4—Stacking rotor laminations on arbor in assembly department

Fig. 5—Spinners, furnaces and high-frequency control panel in Copperspun Department, Freeport, Ill., plant of Fairbanks, Morse & Co.

"MUSTS" IN

Silver Brazing Stainless



By A. W. SWIFT
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Fittings and connections are easily brazed on stainless steel controls are exercised in cleaning joint area, fluxing, heating and tinning. Main difficulty lies in handling chromium oxide which forms rapidly on surface of steel. Here the author analyzes and disposes of problems encountered on several specific production jobs

LOW FLOW point silver brazing alloys have been successfully used for over 10 years in the brazing of various types of fittings and connections to stainless steel assemblies. Manufacturers of steam turbines, for example, have silver alloy brazed literally millions of joints on the spacers and lacing wires of stainless steel turbine blading, Fig. 4. These joints must withstand severe vibration and tension at various elevated temperatures.

Again, millions of joints were silver brazed to stainless steel evaporators on many leading makes of household refrigerators. Those joints consisted of copper, brass, or copper-coated steel tubing silver brazed quickly and economically to the evaporator shells. Some of the 18-8 stainless steels such as 302, 302B, 321, and 347 can be

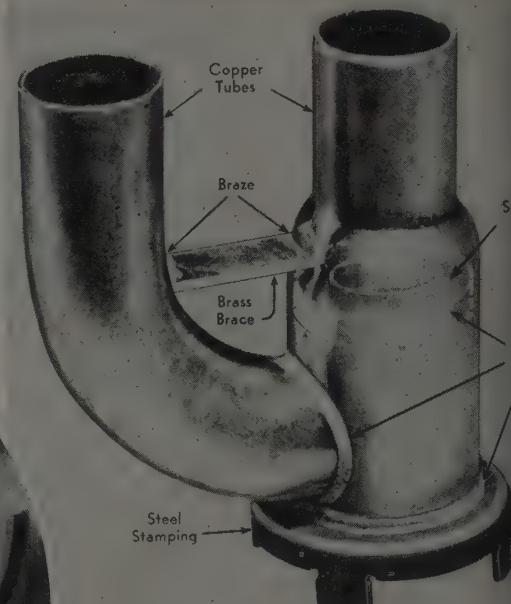


Fig. 1—Small curved blades are silver brazed to form this stainless steel aircraft engine fuel pump impeller

silver brazed quite easily. Those that are found more difficult to braze are the straight chromium steels such as 410, 416, 430 and 446. The machinable 18-8 stainless steel 303 is also somewhat more difficult to braze than the other types. Generally speaking, as the chromium content goes higher the difficulty of brazing increases.

From experience gained in studying a great number of cases during the past 10 years the one main difficulty in obtaining a good silver brazed joint on these steels lies in handling the chromium oxide which forms rapidly on the surface of the steel. The first step in any good silver brazing operation is the cleaning of the joint area. On ordinary clean steels free of rust and mill scale, degreasing is all that is necessary.

On the chromium content steels it is necessary to go a step further. After degreasing, and just before the fluxing operation, a mechanical or an abrasive cleaning of the surface of the joint area results in a better wetting action of the brazing alloy on the steel and thus, a higher strength joint. Next important step is the fluxing operation mentioned above. This flux should be applied in a smooth paste form making sure that all of the surface to be brazed is smoothly coated with flux. Two successful methods of assuring this have been observed. In one, a wetting agent has been added to the flux so that there will be no uneven coating of the flux to leave bare spots or islands of unprotected metal in the joint. Others have found that by moving the two fluxed surfaces against each other after fluxing, they ob-

tain a smooth and very complete overall coating of flux.

The crack between the joint areas should be sealed off completely with the flux. This sealing off operation has also been found to help prevent the formation of islands of unbrazed metal in the joint. It helps prevent the intrusion of oxygen within the joint while it is being brought up to heat.

Heating: The heating operation should follow rather soon after the flux has dried. Regardless of the means of heating, whether it is induction, multiflame oxygas or oxyacetylene, electric resistance or furnace brazing, of various types, both parts should be heated as evenly as possible. In other words each part of the joint area to be brazed should be brought up to the flow point of the brazing alloy at the same instant.

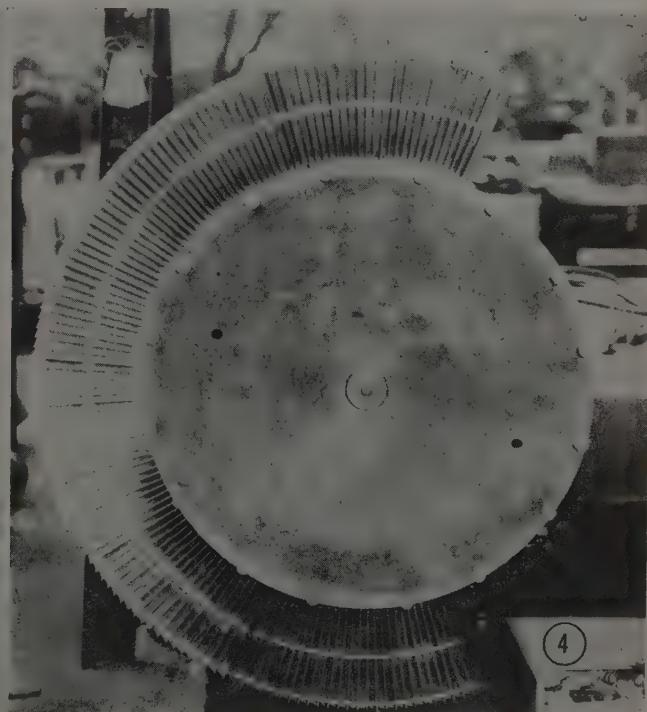
Heating cycle should not extend over too long a period of time, as the flux may become loaded with oxide. It is very bad to have one light section of a part brought up to 1600° F while another heavy section is only barely up to 1200° F. Such a situation would mean that the flux on the part which is at 1600° F would be rapidly used up in dissolving and absorbing the oxides, both iron and chromium. It might possibly happen that by the time the heavier section was up to brazing temperature the flux absorbing action would be at least partly spent, and a partial braze would result.

To obtain a complete tinning or wetting of the silver brazing alloy on the types of chromium content steels most difficult to braze, such as the higher straight chromium steels, it has been ob- (Please turn to Page 132)



Fig. 2—Silver alloy brazing of a stainless steel seat to a copper tube in auto heater shows adaptability of these alloys

Fig. 3—Three brass fittings silver alloy brazed to stain-



less steel spacer for thermostatic refrigeration valve

Fig. 4—Joints on spacers and lacing wires of stainless steel blading for steam turbines are silver alloy brazed

Periodic Reverse Current

ELECTR



A NOVEL process of electroplating in which plating current is reversed briefly at short intervals is producing plated deposits of superior quality while markedly reducing polishing costs at the same time. Periodic reversal of current deplates unsound and inferior metal deposited in a previous plating period, whereas completion of the plating cycle enables the building up of many microscopically thin increments of sound metal into a deposit more dense and of greater homogeneity than deposits produced by conventional continuous-current methods.

With the periodic reverse current process, it is possible to produce a plate that is considerably smoother than the surface of the base member to which it is applied. For example, 0.0015-in. of copper have been plated on shot blasted steel without any evidence of the roughened finish being apparent at the surface of the copper plate. Burned electrodeposits, nodules, exaggerated build-up of metal at corners or at sharp points, and burrs can be reduced or eliminated as shown in Fig. 1, when the new process is used.

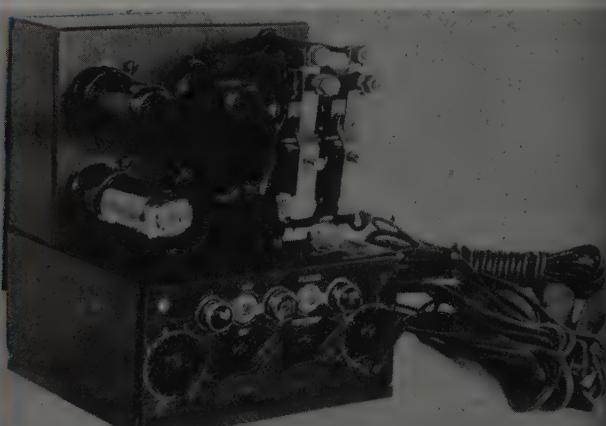
For most applications, the periodic reverse-current process consists of a cycle in which the plating current is applied for a period of from 2 to 40 sec to deposit a microscopic increment of metal and then the current is reversed for a period of from $\frac{1}{2}$ to 5 sec to remove a portion of the previously plated increment. (See Fig. 2). This reverse

Fig. 1—Characteristic cross-sections of direct-current and periodic reverse current deposits

Fig. 2—Theoretical current curve for periodic reverse current plating

Fig. 3—Various types of electroplating current

Fig. 4—Electronic timer and relay for experimental periodic reverse current plating



By GEORGE W. JERNSTEDT

Manager

Electroplating Projects, Westinghouse Electric Corp.
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LATING

Brief reversal of plating current at short intervals feature of flexible new plating process. Advantages include faster plating, removal of unsound metal, heavier deposits of greater density, plate smoother than base metal and brighter surfaces

urrent period is sufficient to remove the unsound and inferior metal that has been plated during the time the work as cathodic. Repetition of the cycle builds up the plate thickness wanted. Reversal of the current deplates from 0 to 50 per cent or more of each increment just plated. The amount to be deplated per cycle is regulated in accordance with the quality of the increment and the desired quality of overall deposit.

Optional Methods: There are several methods by which the process can be carried out. The most obvious method to reverse the current at the tank. This can be accomplished by means of low voltage contactors plus a timing device, as shown in Fig. 4. Another method is to reverse the field current in the generator. This can be done by means of a timer similar to the one employed in the low-voltage reversing method, operating relays of suitable size carry the generator field current. There are merits in this method. There are still certain problems that arise in the operation of a generator when its field is reversed rapidly as is required.

Certain definite and valuable results are secured by the reverse-current deplating. Unsound and inferior metal is removed preferentially to produce flat, level surfaces. The surface of the increment is smoothed progressively with each succeeding increment. The metal surface is brightened by the current reversal and hand buffing or polishing, therefore, can be cut down or eliminated. Due to the sounder metal and smooth surface produced by current reversal, succeeding increments actually adhere more tightly. Almost any thickness of plate, for example, 1 in. thick, can be produced without surface flaws. Furthermore, the speed of the plating process can be increased in producing heavy electrodeposits without sacrifice of quality.

In electroplating a base metal using any given solution electrolyte, the limit on the current density that can be employed to deposit metal is reached when the electrolyte immediately adjacent to the base member becomes so depleted in metal ions that further increases in current density will not produce proportional increases in deposited metal. Thereafter, a certain amount of the water in the electrolyte

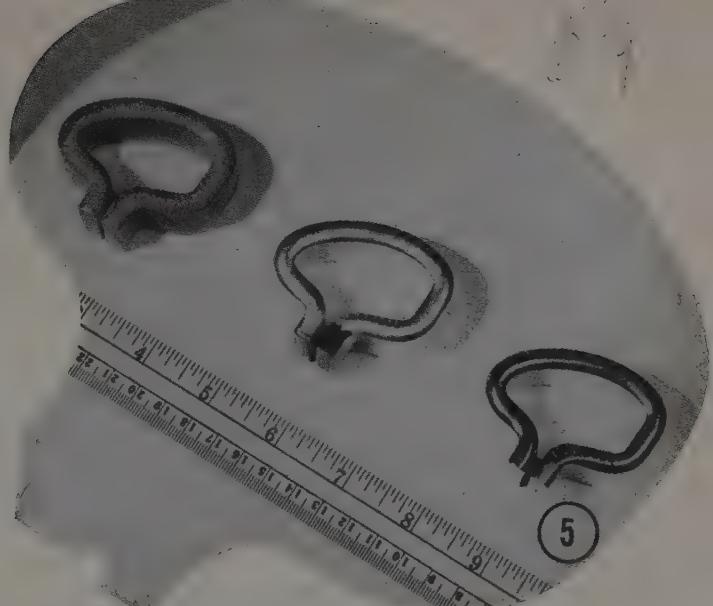


Fig. 5—(Left) High-speed duPont copper solution direct-current rack plated magnet; 0.015-in. average, 60 A.S.F., 5 hour bath filtered and agitated. (Center) Same solution, barrel plated; 0.015-in. average, time 7 hours. (Right) Same solution, periodic reverse current plated; 0.012-in. av., 4 hour bath filtered and agitated. All magnets received approx. 30 grams copper

begins to decompose, and hydrogen is formed on the surface of the base member, thus reducing the plating efficiency. This hydrogen tends to blanket the surface of the base member and thereby greatly diminishes the rate of metal deposition. This phenomenon is known as polarization. Plating is ordinarily conducted at such a rate as to prevent or minimize polarization. By use of periodic reverse-current electroplating, enough ions are established adjacent to the base metal during periods of reverse current so that the effects of polarization are made negligible even with overall speeds of plating increased many fold over that possible with continuous direct current.

It would appear that due to the reverse- or deplating-current portion of the cycle, the overall efficiency would be greatly reduced as compared to continuous direct-current plating. For example, if a cycle of 5-sec plating-time current and 1-sec reverse current totaling 6 sec were employed, it might be assumed that the net metal deposited would amount to that applied in 4 sec plating time using continuous direct current, so that the same current density with the latter would produce an equal deposit in $66\frac{2}{3}$ per cent of the time. A number of compensating factors reduce this apparent time loss. The plating part of the cycle in many solutions appears to operate at 100 per cent efficiency as compared to direct-current plating processes where the efficiency is normally 80 per cent or lower. Reduction in polarization when the new process is used expedites the plating part of the cycle so that the subsequent plating efficiency is improved. The main reason for the speed of periodic reverse-current plating is that the plating portion of the cycle can be carried out at greater current densities than would be possible with conventional plating systems.

Produces Quality Work: The quality of plating done by the new process even at high speeds is usually better

than the best continuous direct-current plating. As an example, previously 0.016-in. of copper has been deposited on meter magnets in from 7 to 10 hours, using potassium-copper-cyanide barrel plating, in what was considered fast plating. Using rack plating this time was cut to about 5 hours, but the plate was so nodular that it was pebbly in appearance. With reverse-current, a deposit was produced superior in smoothness and density in less than 4 hours, and several times the job was done in 3½ hours (See Fig. 5).

Comparison with Other Methods: A schematic comparison of various methods of current modifications is shown in Fig. 3. The first curve represents direct current as secured from a battery or a generator. The second curve indicates the wave pattern that might be expected from a three-phase, full-wave, metallic rectifier. The results from this type of current source in comparison with the generator source are, for all practical purposes, identical.

In the case of the third curve, a direct-current source, either rectified or generated, is applied and then a 60-cycle, alternating-current potential is superimposed on the

direct-current circuit. By this means, it is intended to increase the allowable current density and thereby expedite the plating. There is little practical evidence that such is the case.

The fourth curve indicates a somewhat similar condition. However, the negative portion of the alternating current cycle is eliminated, and the result is a pulsed direct current of the same frequency as the alternating current. The additional benefit advanced for this process is that the total coulombs passed in any given time can be increased appreciably by this pulsing procedure and, consequently, a faster plating rate obtained. Here, again there is little evidence that any real benefits have been secured by this method.

The theoretical periodic reverse-current plating cycle is shown in the last curve. It is evident that the reverse period is of an appreciable length of time in comparison with any of the previously indicated current procedures. In most cases, the length of the overall cycle is over 30 times that employed in the other procedures. The actual number of coulombs employed in the reverse period is often sufficient to effect deplating of from 30 to 40 percent of the metal deposited in the plating, or first part of the cycle. As is the case with any process, best results are obtained only when the process is properly applied. Periodic reverse-current plating can be controlled accurately to emphasize any of its benefits, depending upon the proposed application.

Electrolytes: As might be expected, the new technique works much better with some electrolytes than others. In several cases no improvement has been detected in periodic reverse-current plating as compared to conventional continuous direct current. However, a definite and substantial improvement is evident in most acid and alkaline electrolytes by the new process. In the cyanide baths, results with reverse current plating are outstanding. Smoother, brighter and more corrosion-resistant coatings are produced in almost every case. Reverse-current plating is especially adaptable for depositing thick, dense, coatings of copper from a cyanide bath. For example, it is possible to electroform parts in a cyanide solution, thus avoiding the limitations of the acid copper process, such as poor throwing power and double the power requirement. Greater plating speeds and higher quality copper are prime features of periodic reverse-current plating.

Other metals than copper have been tried. From this it appears that the baths most suited for this process are, in general, cyanide-type plating baths, such as copper, silver, zinc, cadmium, and even gold. Brass works very well and even can be made to plate bright directly under certain conditions. However, to employ any of the baths, an investigation to determine the best reverse-current cycle should be made in any given application before any specific plating set-up is recommended.

Brighteners can be left out when the new process is used, though they may help in some cases. Occasional use of the full benefits of periodic re-

Fig. 6—Photomicrograph at X500 of d-c high-speed copper-plated steel; 0.006-in., 500, 80 A.S.F., 45 min

Fig. 7—Photomicrograph at X500 of periodic reverse current high-speed copper-plated steel; 0.006-in., 120 A.S.F., (90 A.S.F. effective) 35 min



METHOD for preparing a sliding scale exposure chart for x-ray and gamma-ray exposures so that data available on several existing charts can be incorporated in one chart for convenient use, is described by Eastman Kodak Co., X-ray Division, Rochester, N. Y. The method is as follows:

Thickness of the material is laid off along the lower edge of the blank chart, provided (these various materials can be obtained from previously mentioned address) using as open a scale as possible. It is of no consequence, however, if the entire width of the blank chart is not employed. The narrow exposure scale then is fastened along the left hand edge of the blank exposure chart; attachment need not be permanent, but should be firm enough to prevent slipping during the following operations. This narrow exposure scale should occupy the same relative position as the exposure scale of the original chart.

In other words, if the minimum exposure shown on existing chart is 20 milliampere-minutes, the narrow exposure scale should be fastened to the blank chart in such a position that 20 milliampere-minutes falls on the thickness axis.

In some cases the range of exposures covered on the existing chart will not agree with that of the exposure scale supplied. This may be easily adjusted, since all the exposure values on the new scales may be multiplied by

Constructing a MULTIPLE EXPOSURE CHART for X-Rays

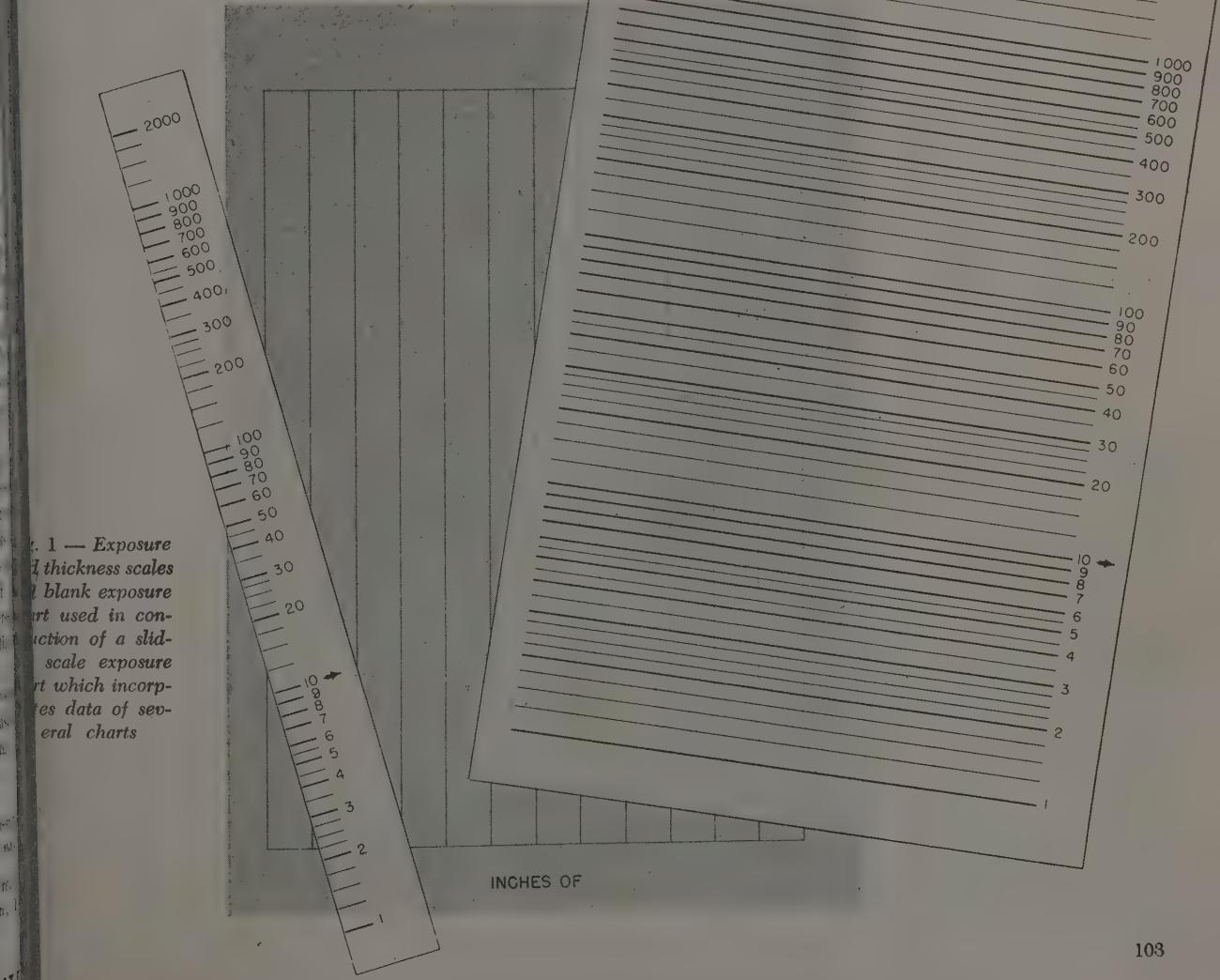


Fig. 1 — Exposure and thickness scales of blank exposure chart used in construction of a sliding scale exposure chart which incorporates data of several charts

some power of 10 (e.g., 0.1, 10, or 100) without affecting their use. In this way the range covered by the new exposure scales may be made to agree with that of most other exposure chart scales.

When exposure and thickness scales have thus been added to the blank exposure chart, the various kilovoltage lines of the existing chart may be transferred to it. Ink lines will "take" better if the region to be inked is first rubbed lightly with a soft eraser.

The transparent exposure scale is placed over the completed chart so that its vertical position coincides with the temporary scale at the left. A mark corresponding to the position of the arrow on the transparent scale is then put on the exposure chart. This may be done by pricking through the transparency, for example with a pin or the point of a divider. This point on the exposure chart is then marked with an arrow and identified with the film and density to which it corresponds, i.e., to the film and density on which the original chart was based. Whenever the sliding scale is placed so that the two arrows coincide exposures may be read off which will correspond to those of the original chart.

This chart may easily be made to refer to another type of film as follows. Let it be assumed, for the sake of illustration, that the original chart is based on $D = 1.0$ using no-screen film, and that it is desired to make it also applicable to type A film of the same density. The relative speeds of no-screen film and type A film are found from the published data to be in the ratio of 400 to 100 or 4 to 1.

This means that exposures on type A film must be four times as great as the corresponding exposures on no-screen film, and the new exposure chart must indicate this fact. The transparent exposure scale is placed on the chart so that the line for 4 milliamperes-minutes coincides

with the mark for 1 millampere-minute on the temporary scale at the left of the chart. A mark is made on the exposure chart corresponding to the position of the arrow of the sliding scale. This point may then be marked with an arrow on the exposure chart and identified with the notation that it refers to type A film, $D = 1.0$.

Whenever the sliding scale is in position so that its arrow coincides with this point on the exposure chart, exposures for type A film may be read directly. If the second film is faster than the one for which the chart was originally drawn, the procedure is exactly the same, except that the transparent scale will be displaced upward.

In order to make it possible to read directly the exposures required to give various densities on the same film, the procedure is as follows: It is assumed that the original chart was drawn to give a density of 1.0 on no-screen film, and that it is desired to read the exposures to give a density of 2.0 as well. The left hand curve of Fig. 2 is the characteristic curve for no-screen film developed for 5 min in Kodak rapid x-ray developer at 68° F. The values of logarithm of relative exposure ($\log E$) necessary to produce densities of 1.0 and 2.0 are shown at points A and B respectively.

$$\log E \text{ to give } D = 2.0 \text{ is } 1.64$$

$$\log E \text{ to give } D = 1.0 \text{ is } 1.24$$

$$\text{Difference in } \log E = 0.40$$

$$\text{Antilog of this difference is } 2.5$$

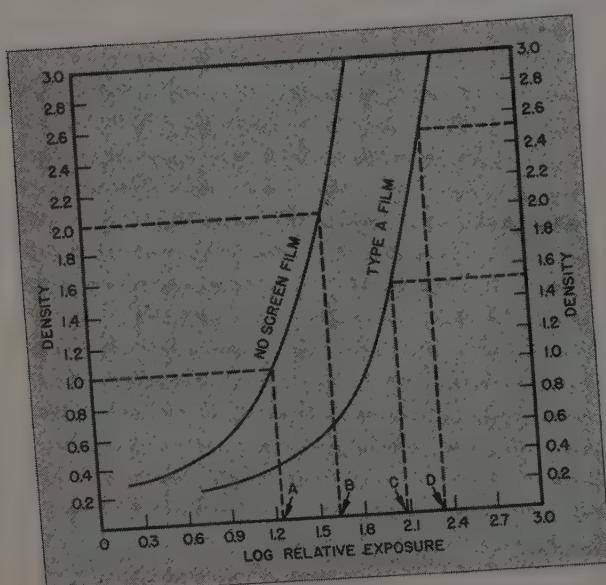
Therefore, the transparent exposure scale is adjusted so that the line for 2.5 milliamperes-minutes coincides with the mark for 1 millampere-minute on the temporary scale at the left. (Or that the line for 25 milliamperes-minutes on the transparent scale coincides with the mark for 1 millampere-minute.) Then an identifying arrow is made on the exposure chart to agree with the position of the arrow on the transparent scale in the same manner as before. Whenever the transparent scale is in this position exposures to give a density of 2.0 on no-screen film may be read directly. If the new density is lower than that for which the chart was originally drawn, the procedure is the same except that the transparent scale will be displaced upward.

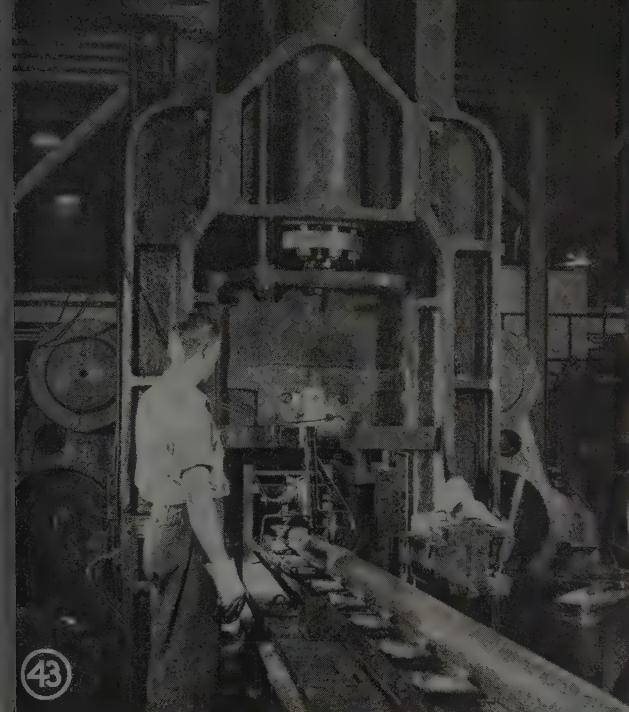
In some cases it may save time to be able to read directly the exposures necessary to produce various densities on several types of film. The procedure in this case is merely an extension of that already outlined. Fig. 2 shows the values of $\log E$ to produce densities of 1.0 and 2.0 on no-screen film and of 1.5 and 2.5 on type A film (points A, B, C and D respectively).

The last column of the accompanying table gives the factor by which an exposure which gives $D = 1.0$ on no-screen film must be multiplied in order to give, on the film of column 1, the density in column 2. Suitable marks for positioning the sliding scale then are made and identified in the same manner as described in the previous example.

If one film and density are used with various focus-film distances the ratio of intensities at the various focus-film distances relative to the in- (Please turn to Page 134)

Fig. 2—Original chart used in text as an example of how method may be applied to read directly exposures necessary to produce various densities





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By ALLEN G. GRAY
Consulting Editor, STEEL

TECHNIQUE required for hot drawing magnesium alloy sheet was developed largely from standpoint of making a part in a single operation. This was due to the fact that the extent of draw which can be obtained is so large that the great majority of parts usually can be made in this manner. However, when parts with extremely deep draws are required, double draws are necessary. Top limits for single draws for certain of the Dow alloys are given in Fig. 45.

$$D - d$$

The drawability factor $\frac{D - d}{D}$ is the ratio obtained by dividing the blank diameter minus the draw diameter, by the blank diameter. Because careful control is re-

Continuing his discussion of forming methods, the author outlines drawing, hand and stretch forming, bending extrusions, spinning and forging techniques

FORMING

Magnesium

Alloys

quired to make draws of the extent shown, top limit for a draw is generally set somewhat lower than the maximum given. Depth of draw in most parts, however, is not of primary consideration; usually no trouble is experienced in drawing to the depth required. More trouble is generally encountered in keeping the metal free from puckers in parts with rounding contours. In almost all cases, however, this trouble can be eliminated by the proper use of the tools.

Drawing Temperature: The temperature required to run a given part is roughly estimated at the time the dies are designed, on the basis of depth of draw and general shape. Typical forming temperatures are shown in Table XXIII.



Fig. 43—Extruding magnesium tubing

Fig. 44 — Magnesium forging being removed from die

In designing dies made from material other than magnesium alloys, allowance for difference in expansion coefficients is usually made for the optimum drawing temperature of 600° F (315°C) for annealed sheet. Dies for forming hard-rolled sheet are designed for the maximum temperature which will not result in excessive annealing. The range of temperature which provides nearly maximum drawability is about 100° F (56°C) above or below the temperature for which the dies were designed.

In case the part is not within tolerance on its diameter, the temperature may be adjusted within this range to correct the size. For example, a part run at a temperature of 600° F (315°C) and found to be oversize can be made smaller by running the die at a higher temperature. This results in the part being removed from the die at a higher temperature. Consequent increase in contraction more than offsets the increase in

TABLE XXIII
FORMING TEMPERATURES FOR MAGNESIUM ALLOYS

Dowmetal Alloy	Condition	Working Temperature Range °F
FS-1a	ANNEALED	400-500
FS-1h	HARD ROLLED	275 or 300 MAX.*
J-1a	ANNEALED	550-650
J-1h	HARD ROLLED	400 MAX.
Ma	ANNEALED	550-650
Mh	HARD ROLLED	400 MAX.

*300 °F may be used if metal is at temperature 15 min. or less.

TABLE XXIV
COMPOSITION OF MAGNESIUM FORGING ALLOYS

Alloy Designation	Nominal Composition	Method of Forging
Dow M	Mg + 1.5Mn	Hammer and press
Dow J-1	Mg + 6.5Al + 1Zn + 0.2Mn	Press
Dow 0-1	Mg + 8.5Al + 0.5Zn + 0.2Mn	Press
Dow 0-1A	Mg + 8.5Al + 0.5Zn + 0.2Mn	Press plus age
Dow 0-1HTA	Mg + 8.5Al + 0.5Zn + 0.2Mn	Press plus heat treat & age
AM658S	Mg + 3.5Al + 5Sn + 0.5Mn	Hammer

size at temperature due to expansion of the dies.

In a few cases of simple flanging operations when the metal is formed so rapidly that it does not assume die temperature, raising the die temperature will increase the part size. In cases of this type, it is possible to adjust the part size both by varying the die temperature and by changing preheat temperature.

Temperature required for the punch is determined by the shape of the part. For ordinary draws the punch is not provided with heating elements because it absorbs sufficient heat from the draw ring and pressure pad heaters. Punches for forming shapes such as

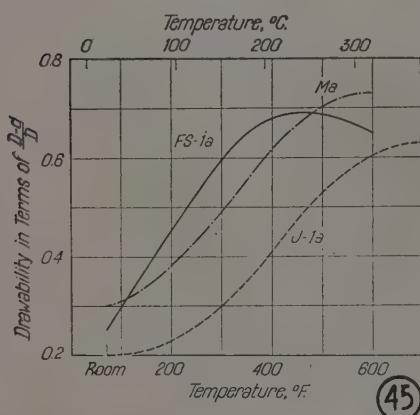
hemispheres are provided with heating means so the sheet can be formed to the hot punch without puckering. For very deep draws the punch is provided with a coolant such as circulating water. Punch is cooled because while heat is provided in the blank between the holding plates, making it possible to compress the sheet plastically without forming wrinkles, sufficient strength is still obtained in the sheet by cooling it as it contacts the punch to draw the sheet from between the plates.

Unique use of temperature as a control is employed in parts having slightly crowned surfaces such as wheel fairings which must be held to quite close tolerances. Separately controlled burners are provided at the inside and outside of the die. If more crown is required, outside of the mating die is run hotter than the inside. Part is held in the die a short time so the sheet assumes die temperature. Since outside of the sheet is hotter than the inside it contracts more after being removed from the die and the crown is raised. For less crown the relative heat on the inside and outside is shifted in the opposite direction.

Die Holding Pressure: The blank holding pressure required to form a given part depends on a number of factors which make an accurate estimate impossible. Therefore, pressure is determined by trial and error. Sufficient pressure must be used to prevent wrinkle formation between holding plates, yet it must not be great enough to result in tearing in that portion which has passed the draw ring radius. For a given punch shape pressure must be increased as deeper draws are required. The depth of draw, however, is secondary in determining pressure requirements when the punch shape is such that large unsupported sheet areas exist at the start of a draw. In drawing a hemispherical shape, for example, sufficient tension must be placed on the sheet in a radial

Fig. 45—Limits for hot drawing magnesium alloy sheet in a single operation

Fig. 46—Forged magnesium hydraulic parts of aircraft



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(Please turn to Page 138)

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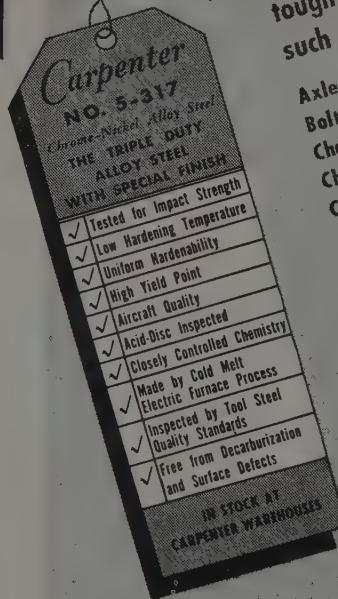
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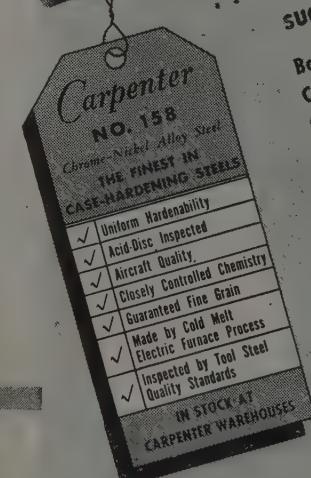
LLOY STEELS

... made in a tool steel mill
... inspected by tool steel standards



... for hard tempered or
tough tempered parts
such as ...

Axes
Bolts
Chain Rollers
Chuck Parts
Clutch Parts
Gears
Locking Pins
Motor Shafts
Pinions
Plunger Rods
Socket Screws
Spindles
Splines
Studs
Tool Holders
Vise Jaws
Worm Shafts



... for case hardened parts
such as ...

Boring Bars
Chain Bushings
Chain Rollers
Clutch Levers
Clutch Parts
Cutting Shanks
Pawl
Pinions
Piston Pins
Power Tool Cams
Power Tool Shafts
Ratchets
Rock Drill Assemblies
Shafts
Wrist Pins

ONE WAY TO Produce a Cam

By ROBERT MAWSON

CAMS for machine tools are being used to an increasing degree. They are being employed on screw, drilling, thread cutting machines and other units that produce parts of an interchangeable nature at a low manufacturing cost.

In many plants, the necessity of making cams is limited and, under those conditions, they are usually produced as a tool-room job—at a high production cost.

John O. Pelchat Sawing Service, Providence, R. I., make all types of cams on a production basis. The method it uses should be of interest to machine shop men.

One of the accompanying illustrations, (Fig. 1) shows one type of cam. First operation in its manufacture is to lay out the shape, from a drawing, on a piece of thin sheet steel. The metal is then removed around this shape to provide a correct template.

Cams are made from a tool steel, or high speed tool round disk about $\frac{3}{8}$ -in. larger than the largest diameter of the cam being made. The man then takes the cam template and scribes off the contour on the face of the cam disk. Center

hole then is drilled and reamed to the correct diameter.

Machining the contour is an important feature when making cams. The method and attachments developed by this company is described here. Figs. 1, 2 and 3 show the holder, wedge, and also how the cam blank is held in the holder by means of the wedge.

Cutting of the cams is done in Do-Al contour machine to which has been attached, at the rear, two brackets "C" (Fig. 4) which hold horizontal pulleys. The two brackets "D", also fastened at the rear of the machine table, carry vertical pulleys.

A $\frac{1}{8}$ -in. steel cable is fastened to an eyelet "E" which is screwed in the rear of the machine table. This cable passes around the lower horizontal pulley, over the vertical pulley and through a hole near the rear end of the lever "F". The cable then passes over the vertical pulley "G", over the rear horizontal pulley and at its free end is attached a length of $\frac{1}{2}$ -in. pitch roller chain "H".

Lever "F" fulcrums on a bearing "J" which is placed on the inside of the machine, and on the lever is a weight "K".

The arrangements of these attachment

(Please turn to Page 136)

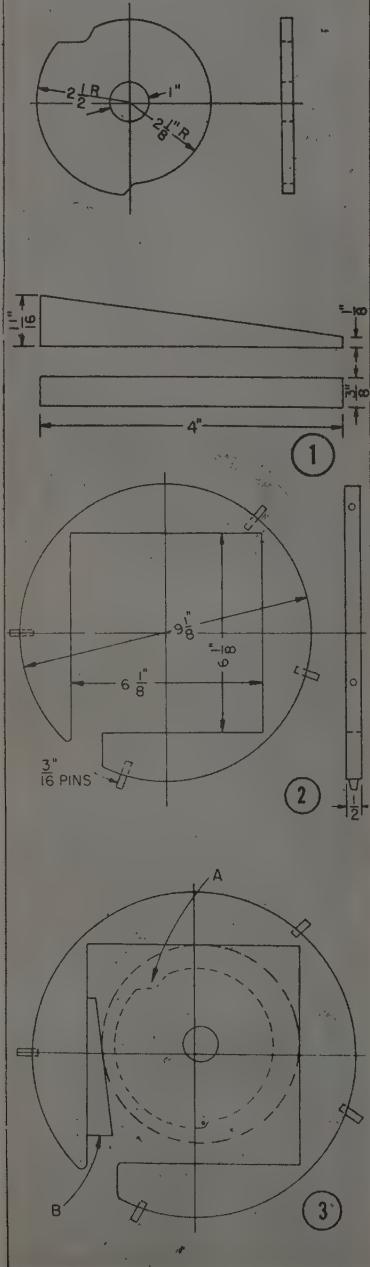
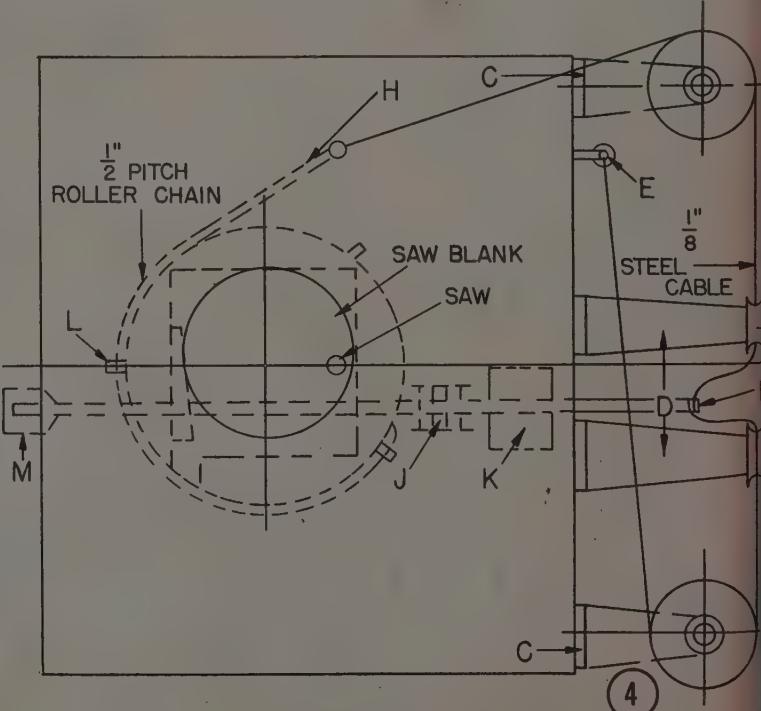


Fig. 1—Detail of cam, above. Below is view of wedge—M. S.—F. A. O.—H'nd

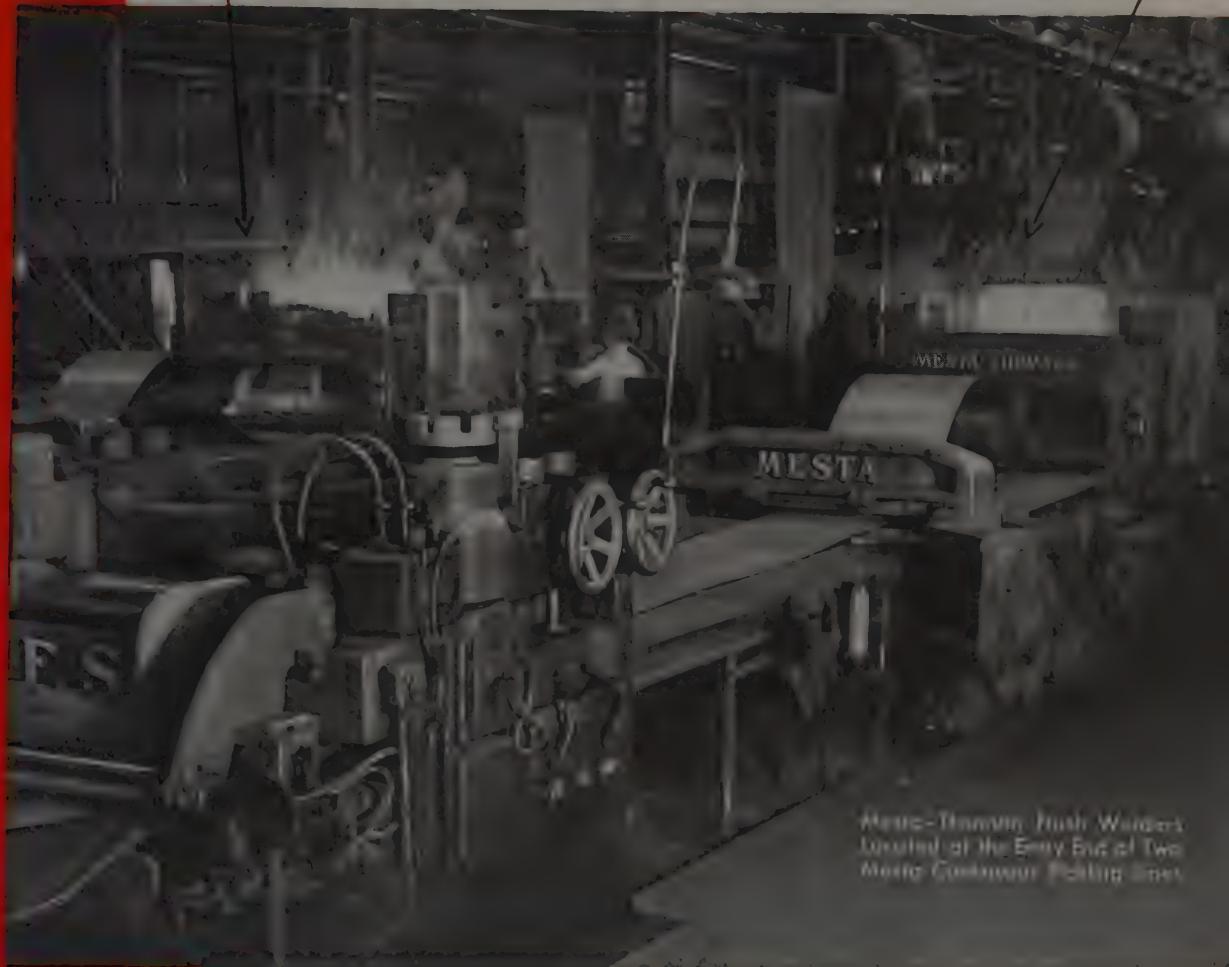
Fig. 2—View of holder. Machined steel—F. A. O.

Fig. 3—Assembly, showing holder, wedge, and how cam blank is held in holder by wedge.

Fig. 4—Attachments in position



Increase... COLD MILL PRODUCTION with MESTA-THOMSON FLASH WELDERS



Cold mill production is increased when MESTA-THOMSON FLASH WELDERS are installed in your continuous pickling lines. They produce heavier coils, with butt-welded joints, suitable for cold rolling on today's high speed mills.

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DESIGNERS AND BUILDERS OF COMPLETE STEEL PLANTS

MESTA MACHINE CO., PITTSBURGH, PA.

Engineering News at a Glance

BACK ON MARKET: Another "war-victimized" product is again on the market. From New York, Air Reduction Sales Co. reports its series 9000 cutting torch with Monel metal head and stainless steel tubes is again available to users. According to the company, a total of 22 interchangeable cutting tips are made for the torch, making it adaptable for every practical hand cutting operation—from removing rivet heads by washing to cutting sheet metal and trimming plate.

PLAYER PIANO TO FUEL TESTING: Principle of the old player piano today is being used for motor car and truck engines, *Automobile Facts* reported recently. In this case the perforated paper simulates engine speed and load conditions encountered in actual highway operation of vehicles. It serves as an indoor "track" and enables accurate tests and experiments to be made under close observation of fuel engineers. A punched tape actuates bellows which in turn cause the engine to accelerate or de-accelerate according to conditions recorded during road service. Exact sequence and duration of road operations—even coasting—can be duplicated hundreds of times on "stripped down" engines in the lab.

CLUTCH "RIDER": An endurance machine for testing a new type clutch subjects the latter to more than 100,000 miles of wear and tear in just two months by automatically engaging it 1000 times per hour, a passenger car maker revealed in Detroit recently. The device tests for mechanical defects, drag or failure to release, and for pedal pressure. It automatically stops, rings a bell and lights up a red signal when a failure occurs. Red light indicates exactly what the trouble is, and where to find it.

INVISIBLE WIRE: In Bloomfield, N. J., Westinghouse recently produced a strand of tungsten wire so microscopic that 1000 ft of it reeled on a bobbin appears invisible to the unaided eye. Processed on special assignment for Bell Telephone Laboratories—to be used in an amplifying tube—the wire, eighteen hundred thousandths of an inch in diameter, is said to be the smallest produced by the plant in its 40-year history of wire drawing. It is calculated that a 20 layer stack of the wire would equal the thickness of only a sheet of newsprint, and that a pound of it would stretch single strands for 950 miles. Since obscure wire sizes are impractical to measure mechanically, engineers compute the average diameter

by weighing an 8-in. strand of the wire on a scale balance, sensitive enough to record the weight of a pencil mark on a postage stamp.

"BEATS" NAMEPLATE PROBLEM: During the war, Marken Machine Co., Keene, N. H., broke the bottleneck of stamping identifying letters and numbers on wrinkle-finished products by adapting its Husky 6 machine to the operation. The machine was equipped with hardened metal dies of special construction and, by using special inks, it simultaneously indented and inked the lettering. New Wrinkle Inc. reports the machine allowed users complete flexibility in imprinting. Parts could be changed easily and quickly, regardless of size, shape and thickness of pieces. The machine now is being produced to meet peacetime requirements.

FROM TUBE TO BRAKE LEVER: At Willys-Overland, in Toledo, a steel tube is converted into an automobile parking brake lever in a single machining maneuver. The operation, which is done on a Colonial 6-ton broaching press, takes only a few seconds, all 20 notches for the ratchet mechanism being cut simultaneously with a single press stroke. According to the company, production is some 175 pieces per hour with a minimum of effort on the part of the operator, who merely picks out a finished lever and drops an unfinished one in place in the fixture.

STANDARDIZES PRODUCTS: All thread plug gages, both standard and special, produced by Detroit Tap & Tool Co., are now precision ground from hardened M-11 chromium-cobalt high speed steel. According to the Detroit company, unless otherwise specified, products ordered from stock will be furnished in this type steel. It is said to provide higher abrasion resistance.

FAST "ROLLING" FREIGHT: From New York, the Ball & Roller Bearing Information Center reports that a new era of high-speed freight transportation by rail was recently forecast with the selection of antifriction bearings for 1000 light-weight coal hoppers and 500 stainless steel express refrigerator cars. First mass move to put the nation's freight carriers on roller bearings was begun early in December by Railway Express Agency which specified antifriction journals for all 500 of its new "reefers." This was followed recently by the Chesapeake &

Ohio Railroad's contract for one thousand 70-ton hopper cars with potential passenger car speeds. A total of 12,000 high precision roller bearings will be required to mount these two fleets of cars on anti-friction journal boxes. With roller bearings, C & O officials state, it is possible to handle a train of the same number of 70-ton cars with the same locomotives now required to handle a similar number of 50-ton cars.

JUGGLES FIGURES RAPIDLY: National Bureau of Standards revealed in Washington recently it has been commissioned by the Bureau of Census and the Office of Naval Research to construct two high speed electronic digital computing machines which may revolutionize methods of classification and compilation of data and numerical computation. According to the bureau, the computers will be capable of handling huge compilation problems and of solving the most complicated differential equations in engineering and physics. They will perform predetermined sequences of calculations running in hundreds of operations without intervention of human operators. The result will be the solution of problems in days that would take years if attempted by present standards.

ORDERS "CEILING" GAGES: In Schenectady, N. Y., it was learned, the Army and Navy in a move to promote flying safety, recently ordered 125 General Electric ceilometers for installation at military airports throughout the country. Each of the units, consisting of pulsating light device coupled with photoelectric detector, provides a continuous automatic recording of cloud heights and relative densities in daytime and nighttime—information vital to pilots scheduled to land or take off. In operation, the equipment projects a 12 cycle per second pulsating beam vertically into the sky. This is picked up by the scanning ceilometer which is tuned to the same frequency as the light pulses from the projector. A drive between scanner and recorder transmits positions of the ceilometer into the cloud heights on the recorder.

SAVES RARE METAL: Some \$5000 a month is saved by an auto body plant in Detroit through a special oven built recently out of scrap material. The latter reclaims rare "Wood's" metal after it is used for facing wood patterns in the making of dies. Formerly the metal, which costs \$1.25 per pound and is scar-



VULCAN WAS REALLY ASTONISHED IN 1830

Looking down on England in 1830 from his smithy in the sky, Vulcan saw a contraption that automatically made him and his methods old-fashioned: it was a bolt-forging machine, designed and built by one Thomas Oliver. This contrivance, worked by treadle hammers with a back treadle, with a boy to operate the bellows, marked the first application of machinery to forging. All metal fastener manufacturers, including CHANDLER PRODUCTS CORP., owe a great deal

to the man who made Vulcan a second-rater. CHANDLER, in particular, is a slowly developed, carefully integrated organization. Its able management, teamed with skilled personnel, operates a modern high speed equipment in a completely up-to-date plant. It manufactures precise cold wrought basic industrial specialties, in many designs, and according to individually exact specifications, for practical purposes.



Chandler Cold Wrought Engineered Products

CHANDLER PRODUCTS CORP.
491 CHARDON RD. CLEVELAND 17, OHIO

was chopped off—ruining the pattern and leaving a third of the metal in anchor holes in the wood. A department supervisor who noted that the metal melts at 180°, built out of discarded material a gas oven that not only recovers the metal, but also saves the wood patterns for further use.

SCARCITY-SPURRED RESEARCH: Because alloy metals capable of withstanding high turbine temperatures were scarce in Germany during the war, research on ceramic turbine blades was intensified. Some promising results were obtained, according to the Office of Technical Services, Washington, but not complete success. Sintered alumina is the strongest refractory the Germans tried in their experiments. Even at a temperature 2200° F, the tensile strength of the material is about 20,000 psi, nearly five times the tensile stress to which a 3-in. blade would be subjected by a centrifugal force of 10,000 times gravity. Adequate tensile stress is no guarantee of success, however, according to the OTS report. One of the obstacles in using ceramic materials for turbine blades is the matter of attaching the

blades to a metal shaft. In one method tried, the socket was packed with powdered iron. Various blade material combinations were also tried, such as mixtures of alumina with silicon carbide or with iron filings. Experiments also were made with the outside shell of the turbine rotating about a stationary shaft.

RECOVERY BY THE BARREL: Typical of a new development in the oil industry—to increase the productive life of a field by injecting stripped gas back into the reservoir to maintain pressure and keep the oil deposit from disintegrating—is the South Coles Levee Cycling Plant (California) designed and constructed by Fluor Corp. Ltd. According to the latter concern, the plant is of the oil absorption type with a processing capacity of 60,000,000 cu ft per day of wet gas, supplied by 38 black oil and 21 condensate wells located in the adjacent area. The residue gas, after processing, is returned to five injection wells under 4000 lb pressure. Under present conditions, overall plant recovery is about 98 per cent of the normal butane, 88 per cent of the isobutane, about 30 per cent of the propane and all of the

pentane and heavier fractions. At rated capacity the plant is expected to recover about 7000 barrels per day of liquefiable products.

TOUGH TIMING GEARS: Successful development of aluminum timing gears with bonded-in steel hubs for automotive use is announced by Al-Fin Corp., subsidiary of Fairchild Engine & Airplane Corp., located in Hollis, N. Y. These are expected to be especially suitable for heavy duty use in engines or trucks and buses. The gears are of aluminum alloys chemically bonded to steel hubs by a process that gives the bond a tensile strength of 6000 psi. In subjecting one of the gears to a shear test, automotive engineers attempted to press the hub through the gear in an effort to rupture the bond. According to the company, they were unable to budge it even at 98,000 lb pressure. The same gear was then run 123 hours at 4000 rpm on a breakdown test. Still standing the gaff, it was installed in the engine of an intercity truck. After 86,340 miles of operation, the gear was removed for inspection and it was found that no wear was discernible.

"SEES" THROUGH HIS EARS: One of the recent devices expected to broaden employment opportunities of blind persons—not to mention those unskilled—is the Limitron inspection system developed by Arma Corp. of Brooklyn, N. Y. Although blind, operator of the device in the accompanying view—with the aid of an ear attachment substituted for control lights—can inspect, sort and count large numbers of parts, commonly used in the nation's mass-producing industries, at the rate of 5000 to 7000 per hour. The instrument unerringly separates parts that differ in size so imperceptibly as one ten-thousandths of an inch. Operator only places parts

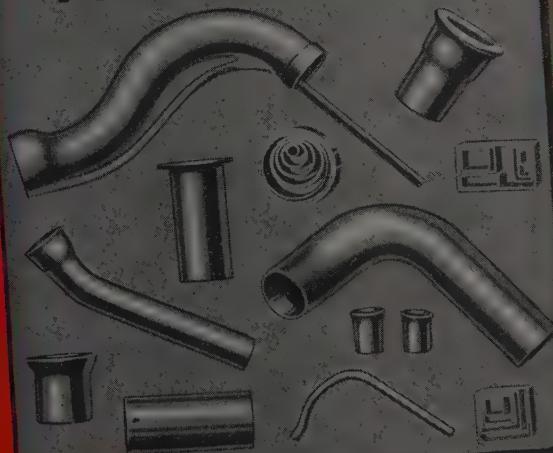
to be inspected on the turntable. From there each passes under a mechanical eye where, according to its size, it sends electronic impulses along the circuits which count the good and oversize parts, and open the chute that routes the part into the correct bin when it drops into the classifier. By its high-speed 100 per cent inspection performance, the device enables inspection to keep pace with the fast production of today's automatic machines.



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SPECIAL SHAPES**

- IN COMMERCIAL LENGTH
- CUT TO SPECIAL LENGTHS



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1/2" to 2 1/4"
14 to 20 gauge



ROUND
1/4" to 4" O. D.
9 to 22 gauge



RECTANGULAR
1/2" to 2 1/4"
14 to 20 gauge

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IN THE past two decades, great progress has been made in the presentation of vocational education in American schools. This has largely been confined to the secondary schools and is often looked upon as not being compatible with a program of higher education in junior colleges or the usual liberal arts college education available to most Americans.

There is emerging in American industry a professional group of men whose responsibilities lie beyond the realm of the skilled operator and approach the professional engineer, yet who are not trained by any formal and orderly means in our present educational system.

These men are variously known as tool engineers, production superintendents, production foremen, toolroom supervisors, toolroom foremen, heads of planning departments, methods engineers, welding engineers, maintenance superintendents, maintenance engineers, chief inspectors, and various other titles which describe the functions performed by these essential key men of industry.

Because of the important role which mechanized techniques now play and will increasingly play in modern America's production of metal products, and because of the need for a better method of training capable mechanics, engineers and managers, the LeTourneau Technical Institute, working with R. G. LeTourneau Corp.'s large new manufacturing plant at Longview, Texas, established a plan for training production specialists.

Basically, the institute's plan is to provide an orderly college level classroom study of science, theory, and associate

TRAINING PRODUCTION SPECIALISTS

Half-and-half college-level classroom study and actual work experience comprise a progressive method for meeting industry's continuous need for fully-trained key men

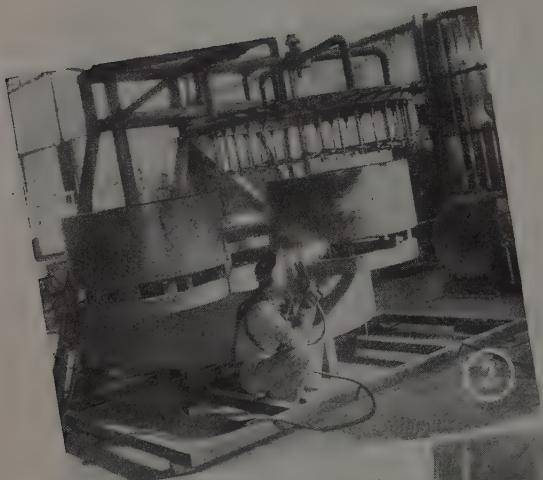


Fig. 1—Electrical theory learned in physics laboratory and classes is applied daily in actual production and maintenance. Here student is winding stator for large alternating-current generator

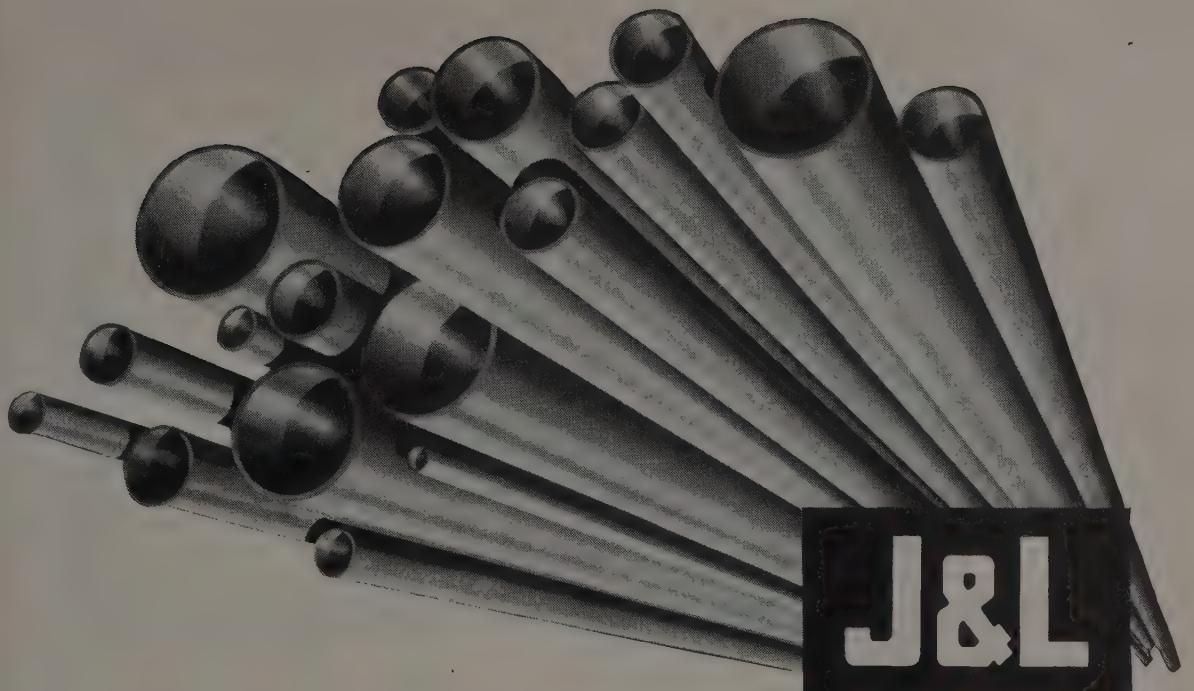
Fig. 2—Designing and building this special flame-hardening unit constitutes an advanced problem in tool engineering on which students participate

Fig. 3—Interior view of LeTourneau's new Longview, Texas, plant, built for the production of heavy earthmoving equipment. Half of each day, students use plant's facilities

By WALTER J. BROOKING

Dean
LeTourneau Technical Institute of Texas
Longview, Texas





J&L ELECTRICWELD STEEL TUBING IS AVAILABLE TO YOU NOW

Manufacturers are taking advantage of the fact that J&L Electricweld Tubing is now available for early delivery. Design and production engineers know that the great strength of this light tubular section permits reduction in weight and bulk with saving in costs of material. It also can be fabricated economically.

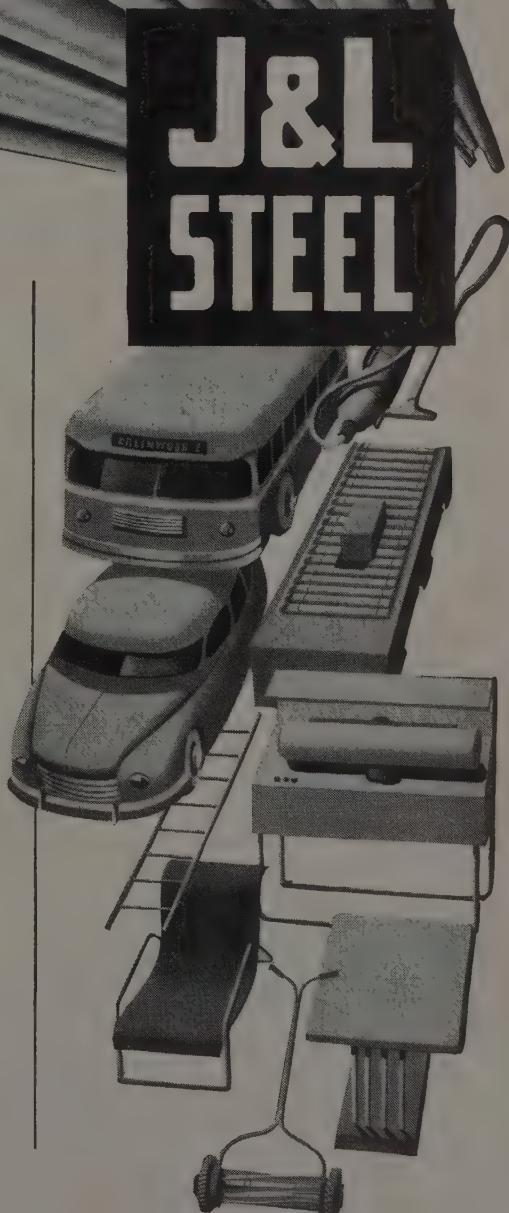
For forming operations, the uniformity of cross-section and wall thickness of Electricweld Tubing makes it possible for products to conform to close tolerance limits. Electricweld Tubing can be altered in cross-section by any number of processes to meet requirements of design. It bends easily in all directions and can be readily joined by mechanical or welding methods.

Beauty and sales appeal in finished products are aided by the smooth, uniform surface of J&L Electricweld Tubing. It provides an ideal base for electro-plating, enameling, and painting. These finishes can be applied with a minimum of surface preparation.

For information on delivery of J&L Electricweld Tubing to increase your production and improve your products, contact the nearest sales office listed below.

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formation on industrial methods associated with mass production for half of each student's school day. Actual work experience is provided in the LeTourneau's nearby factory under the guidance of a full time institute instructor during the other half day.

To economize the student's time, and increase the value and reality of his study, a student is paid by the company at a rate commensurate with his skill as a ginner. Pay is progressively increased during the course, while he is a part-time employee studying in the factory as a part of his regular institute curriculum.

The student commences his work as a skilled student in the factory which is built to produce a new line of heavy moving equipment. After the initial 1 to 3 weeks of vestibule training, devotes the larger portion of his factory time to becoming a machine operator or maintenance workman. Some time after the first few months of his training, or as soon as he becomes sufficiently adept to enable him to do so, he is allowed to undertake regular assignments of work under the guidance of an instructor.

Observe Factory Procedure

This enables him to begin to understand the importance of such factors as standardization of parts, mechanics of setting up tooling, manipulation of jigs and fixtures (and a basis for intelligent criticism and suggestion for design) and overall opportunity to observe what is being done around him in the factory the way of tooling, planning, and production. If maintenance is his special objective, he learns the elements of good maintenance practice, the value of good planning and workmanship, productive maintenance, and the basic concepts of mechanical or electrical devices.

Objective of this plan of education is largely utilitarian, namely to make the student of the program capable of competing successfully for well paid employment, and to foster continued growth in leadership at the end of the training program. It is not a program of "operator training," but one of education of a professional mechanic.

The departments of instruction are as follows: English in the form of written grammar, oral or written reports, composition writing, and the study of current technical literature or scientific publications.

Mathematics is important because it is the basis for orderly science and technology expressed in number, quantity, and measurement. The mathematics course includes simple arithmetic through advanced calculus, depending upon the

need of the students in their various courses.

Mechanical drawing is the standard means of recording and classifying the work of a manufacturing program. It provides the blue-prints which are a "second language" for a manufacturing organization, and also furnishes the orderly means by which plans for industry may be outlined and checked for accuracy, completeness, and descriptive information. As a means of communication, mechanical drawing ranks second to English. It is of great importance as a thinking aid which provides a means by which a student or workman may record his thoughts and check them for completeness and accuracy, as well as to consolidate his thinking in a form which may be acted upon by other workmen.

Physical Sciences Studied

Physical sciences as they apply to manufacturing materials, processing, and technical control of production are presented. Chemistry and physics as they apply to metallurgy, welding, metal removal in machining, flame machining and cutting, and machine design are taught. Training includes the use of regular laboratory equipment and many of the laboratory exercises and technical matter which are commonly presented in chemistry and physics classes.

It is in these classes that the major bulk of technology associated with a given trade or course objective is presented.

The inclusion of certain of the social sciences is of considerable importance to the program of training since they have to do with development of the student's attitude, physical fitness, and mental alertness.

The social sciences taught are: History and government, physiology and hygiene, economics and religious consciousness.

The use of laboratories in teaching students is of utmost importance at LeTourneau because all have a major interest in scientific and engineering subjects. Three distinct types of laboratories are used, including natural science, vestibule training, and the main course objective laboratory work which is done in the factory.

Well-equipped physical laboratories are available for teaching the various courses in chemistry, physics, mechanics and electricity. These constitute the natural science laboratories. Special vestibule training laboratories for machining and welding students are equipped so that during the first three weeks of the student's stay in school, he may spend half of each day in the school vestibule laboratory, learning the essential elements of operating machine tools or of manual

welding. This is time spent without pay on the part of the student, and is preparatory to his being accepted as part-time employee and entering the factory for his later studies. This time also serves as a period of exploration—trying out so that the student may determine whether he himself believes that he is adapted to the subject of his choosing.

The actual experience of work in the shop provides an especially fertile field of laboratory experience, because of the company's practice and policy in the use of jigs, tools, fixtures, special tooling and their maintenance practice. The production machinery used in the plant includes some 400 welding machines of various types and over 350 machine tools and other associated machinery. The variety in size of machine tools from sensitive drills to \$50,000 boring mills, and the variety of work done on the machines provides an almost ideal learning situation for the students.

Library Essential

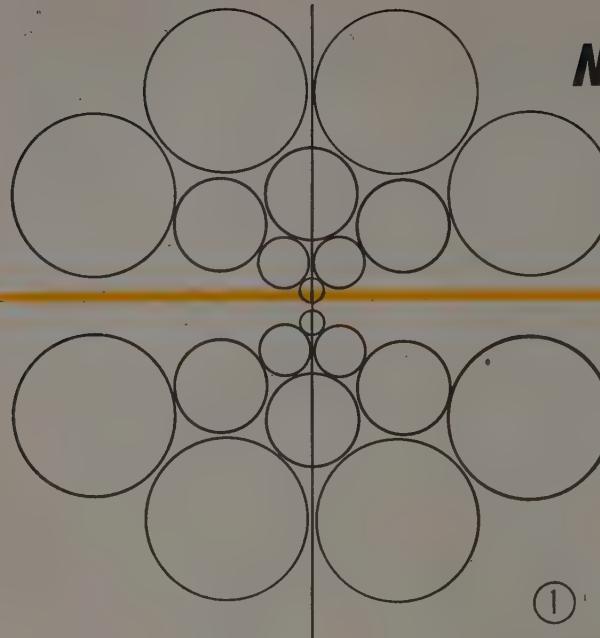
An essential part of the equipment of the institute is the library which includes a complete and broad selection of books on arc welding, machining, metallurgy, electrical and mechanical engineering, chemistry and physics, and the allied subjects associated with modern mass production. A very important portion of this library are the trade journals, periodicals and technical society journals.

This library serves as an important adjunct to the English and economics classes in that the literature available and the subject matter presented may be used for classroom discussion and for improvement of the use of language at the same time that additional technical knowledge is being added to the student's store of understanding of his subject.

The student educated under the LeTourneau Technical Institute's plan should be in a position to assume leadership in some place in his field within a short time after his departure from school.

Adopts Salesroom Method For Industrial Trucks

Sales display and service methods commonly used in the consumer goods field have been adopted for materials handling equipment by Herbert B. Cumming Inc., northern New Jersey sales representative for Automatic Transportation Co., Chicago, electric industrial trucks builders. Located in Rochelle Park, N. J., 10 miles from the state's industrial center, the new building erected by the firm features a sales display room, and a shop area, for servicing all types of electric trucks. The sales center is equipped with all tools necessary for a general machine shop.



New Company Makes

Stainless Steel

Precision cold rolling equipment, annealing and pickling, slitting and shearing facilities convert 1500 to 1700 tons per month of hot rolled stainless into sheets and strip

STAINLESS steel strip and sheets up to 36-in. wide and in the gage range from 0.004 to 0.078-in. are being produced by Washington Steel Corp. This comparatively new company purchased the former plant of the Washington Tin Plate Co., Washington, Pa.

The property has 15 buildings with about 126,000 square feet of floor space. Adequate cold rolling, annealing and pickling, slitting and shearing facilities have been installed to convert from the hot rolled stainless steel strip purchased from outside sources, about 1700 tons of straight chrome or 1500 tons of chrome-nickel steel per month on the basis of 24 gage, either in the form of sheet or strip.

Continuous operations have been made

possible through unique plant layout of operating facilities which eliminates any doubling back in the production line from the entry of hot rolled strip into the annealing and pickling lines until the finished steel leaves the shipping floor. All handling of coils is accomplished through use of gas-powered high lift trucks, cranes and conveyors. Space has been provided so that any equipment in the plant can be duplicated without stopping production.

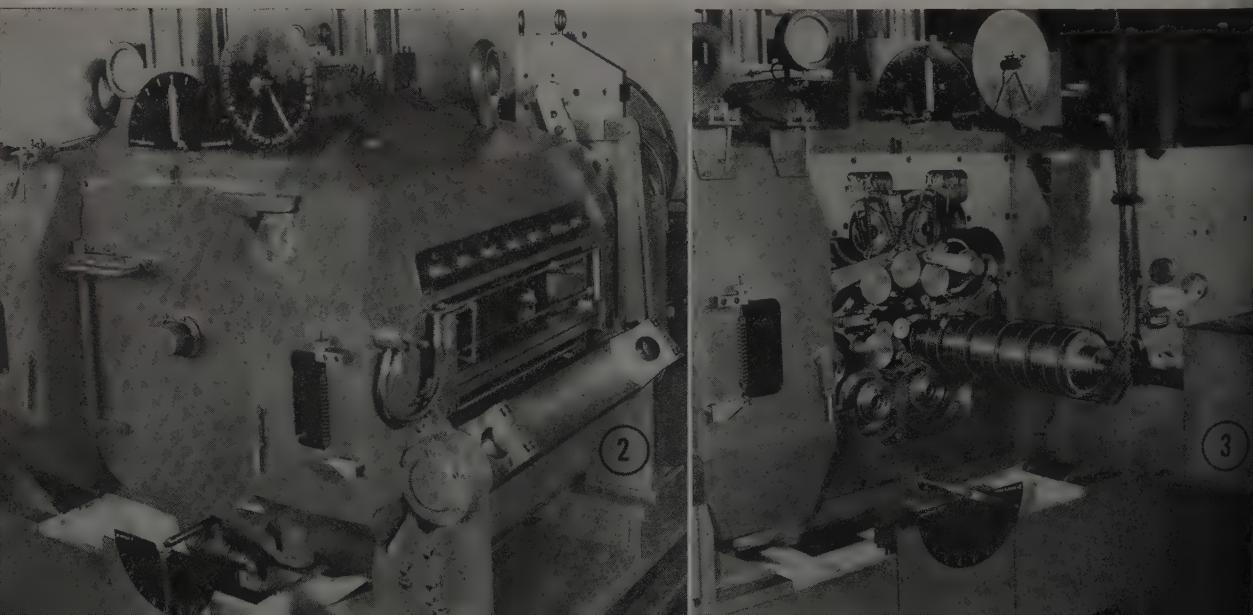
Sendzimir Mill Key Feature

Cold reduction is being done on a Sendzimir precision cold mill, 37" wide, the roll arrangements being shown in accompanying illustrations. This type

mill is a rigidly backed-up unit with long rolls of small diameter. The mill is capable of rolling strip to minute tolerance

Company officials state all flat rolled sheet and strip will be furnished at a remarkably uniform gage throughout entire cross section and length, heretofore unobtainable in the industry where wide strip was rolled. In addition to making possible increased die life, it is claimed the improved physical properties of the steel together with more dense surface condition will increase corrosion resistance. There are other important metallurgical aspects of this comparatively new stainless steel product that are being explored at the moment.

Present operating schedules on



Sheets and Strip

Fig. 1—Schematic arrangement of rolls for Sendzimir mill. This cluster roll design permits rigid backing up of small diameter work rolls, resulting in a product held to minute tolerances

Fig. 2—Another view of cold-reduction mill which accommodates stock up to 37 in. wide. Present schedules call for gage reduction from 0.135 to 0.010-in. in eight passes

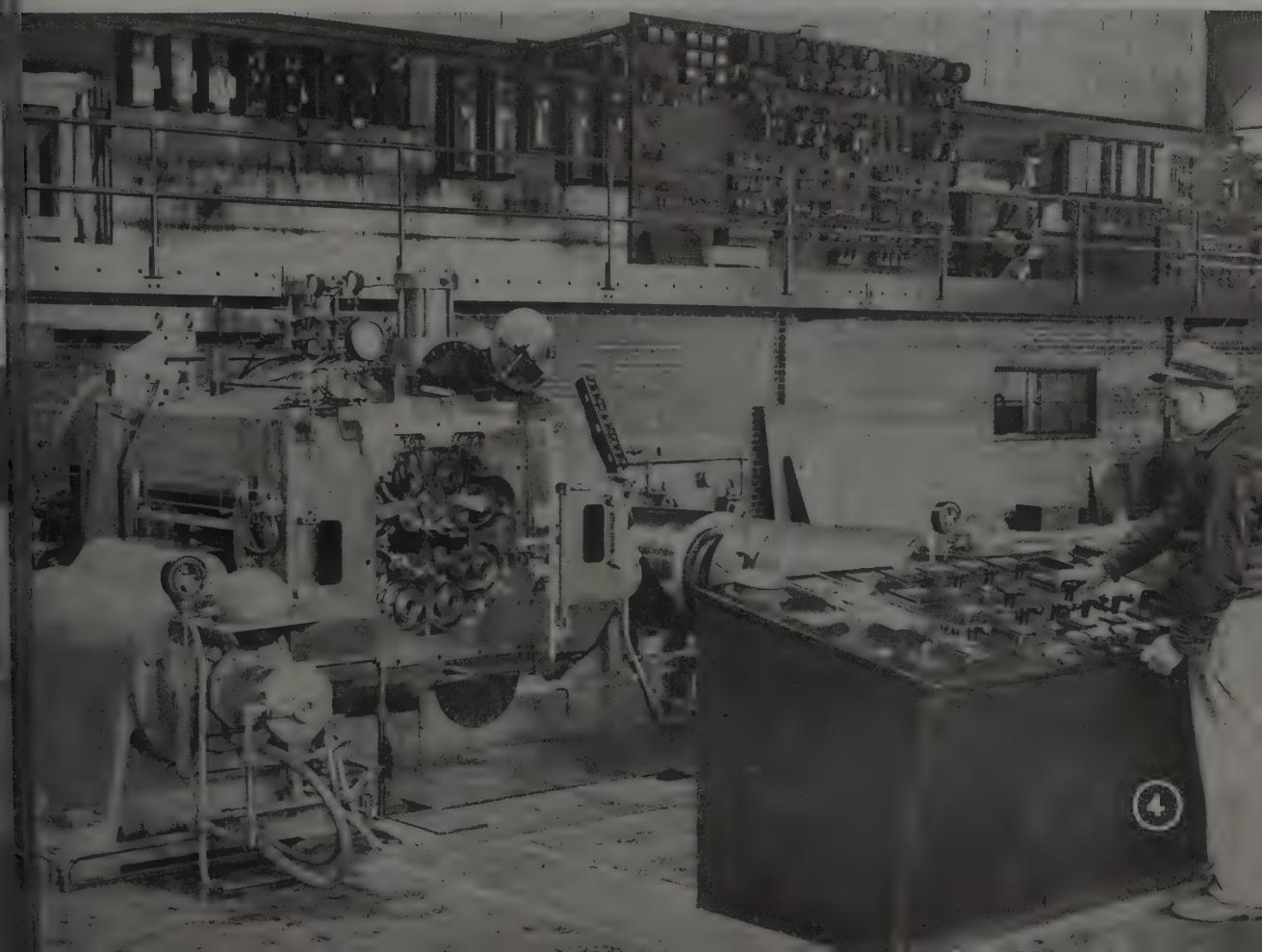
Fig. 3—Weighted device is used for removing backup rolls. There are nine of the latter in increasing diameter for each of the two work rolls (See Fig. 1)

Fig. 4—Mill with housing plate removed. Operator stands at control bench

Fig. 5—Side view of Sendzimir mill with housing plate swung aside to show how work rolls are removed



119



Sendzimir mill call for gage reduction from 0.135 to 0.010 in eight passes without taking the steel off the mill for intermediate heat and descaling treatment. The unit can handle 8000-lb coils and is capable of a feed speed up to 440 fpm, although an average of 225 fpm currently is being scheduled. The mill will stop automatically should for some reason the roll tension be changed or oil flow interrupted. Carbon strip leaders welded to the coils makes possible the maintaining of the scrap loss to an absolute minimum.

Due to the roll arrangement, adequate power, and heavy tension of payoff and winder reels in the Sendzimir mill, it is possible to effect heavy reductions, thus affording light gages without a number of intermediate annealings and picklings common to conventional methods. The roll assembly and strip operate in a continuously circulated bath of conditioned lubricating oil, thus assuring constant temperature operations regardless of seasonal conditions.

The Sendzimir mill is equipped with work rolls 1 7/16-in. diameter. Each of

these rolls is backed up by 9 rolls of increasing diameter. These rolls are described as follows: First intermediate rolls, second intermediate rolls, and backed up bearings. The four exterior second intermediate rolls are driven by the main motor through reduction gears. Adjustment of the work rolls is through four sets of these backed up roller bearings operating on eccentrics and controlled by screw-down adjustments.

Speed Range from 200 to 440 fpm

The main mill motor is 400 hp with a speed range of 500/1000 rpm. The speed of the mill proper through the reduction gear and pinion stand—range from 200 to 440 fpm. Reels 20-in. diameter and each driven by a 300 hp motor provide tension before and after the mill. Solid 20-in. diameter mandrels between inbound and outbound bearings are utilized in place of the more conventional collapsing type mandrels due to the extraordinary high compressive forces.

The 465-ft continuous annealing and pickling line, controlled by two operators,

is capable of handling 4 tons per hour. There are two 40-ft and one 20-ft pickling tanks. The annealing equipment consists of a 40-ft gas-fired catenary type annealing furnace. Next follows the three pickling tanks previously described, capable of either electrolytic or acid pickling. Also immediately after the furnace provision is made for the insertion of a re-pickling payoff reel. As the strip emerges from the descaling tanks it passes through a scrubber and dryer with controlled air temperature and then through rubber covered pinch rolls to a multiple downcut shear.

A tight coiler of conventional design equipped with a paper unwinder completes the line. Handling at either end of the anneal pickle line will be accomplished by overhead floor operated cranes. From the pickling department the coil will be transported to storage or to further processes by lift truck.

Two-High Mill for Certain Grades

In order to handle certain grades of stainless and chrome steel requiring a light skin pass after annealing and pickling operations, a 2-high mill has been installed near the annealing department and in the line of flow to the finishing department. The rolls, 22 x 40-in. are driven by a 250-hp motor and the tension reel by a 75-hp variable speed motor. Coils from this mill with the surface properly protected with paper pass to the inspection department.

Slitting equipment is designed with separate sets of slitters and mandrels so as to reduce the down-time considerably making possible operation 50 to 60 percent of the time. The unit is able to make six cuts simultaneously on 0.083-in. strip at 300 fpm.

The 250-ton stretcher leveler has wedge type jaw with specially designed tool steel inserts; and is capable of handling material up to 0.125-in. thick, 60-in. wide by 243 in. long. The finishing department also is equipped with a backed-up roller leveler and shearing unit which is employed to level and cut to specification.

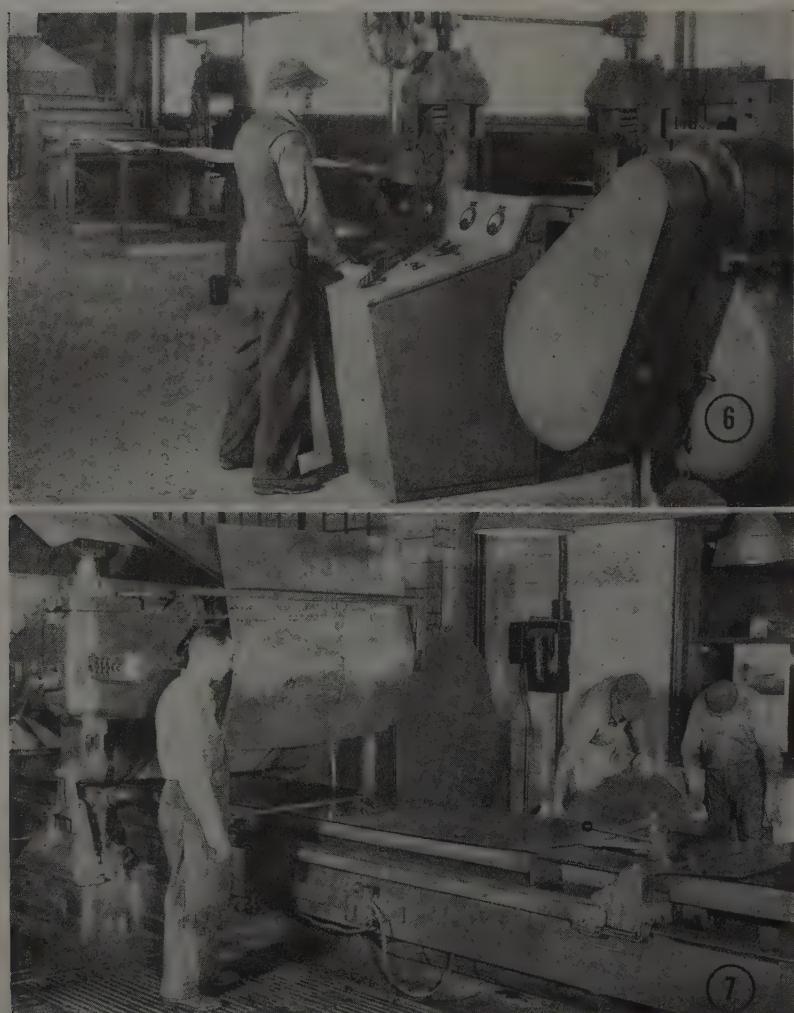


Fig. 6 — Section of 465-ft continuous annealing and pickling line showing pulpit which controls all synchronized equipment on the line

Fig. 7 — A polishing crew polishes and inspects stainless steel sheet. This Mattison polishing machine was the first piece of equipment ready for production

ROLLING MILL PLANTS

DESIGN and construction of rolling mill plants by Arthur G. McKee & Company in recent years include Blooming Mills, Plate Mills, Billet Mills, Rail and Structural Mills, Merchant Mills, Strip Mills, Cold Mills and Tin Mills.

Typical examples of outstanding McKee design are a Russian project, incorporating 10 mills, a large plant in Brazil with 6 mills and the 112" 3-high and 120" 4-high plate mills recently completed in Coatesville, Pennsylvania.

McKee engineering of rolling mill plants is backed by four decades of experience in the design and construction of the Iron and Steel Industry's production facilities from raw materials to finished steel.

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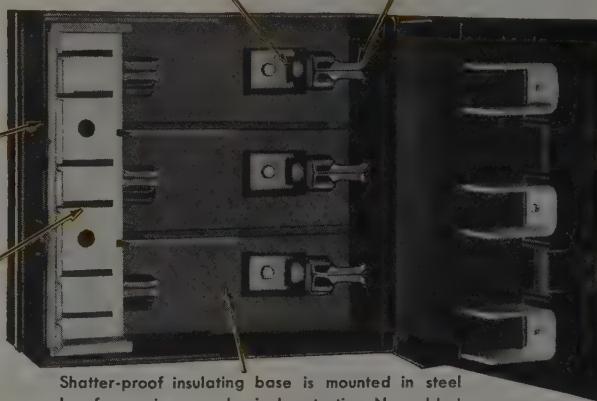
Solder-solderless lugs can be used either as solderless connectors or as solder lugs or both. Furnished on all except 30 ampere, 250 volt units.

Positive pressure fuse clips have high conductivity and assure automatic contact pressure at the fuse terminals without auxiliary parts.

Cam-action provided by handles near switch jaws where it is most needed. This cam-action supplies (with minimum manual effort) the considerable force necessary to provide high contact pressure.

Cover can be locked in either the ON or OFF position by means of a padlock on the bracket.

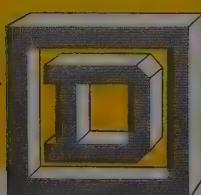
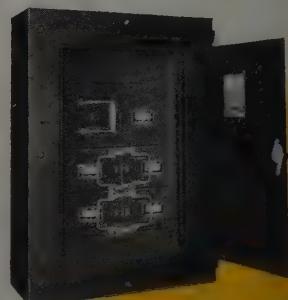
Arc suppressor block greatly increases the rupturing capacity.



Ranging from 30 to 600 amperes, Safflex Switch units are for use in systems up to 575 volts A.C. or 250 volts D.C.

- Notice how simplicity, sturdiness, and safety are built into Safflex Switch units. Opening and closing unit doors operates switch units. Door is permanently anchored; it carries switch blade assembly only, and covers all live parts when closed. When door is open, all accessible live current-carrying parts are dead. All circuits may be opened safely under maximum load. All poles are broken simultaneously, preventing single-phasing. All units except 600 ampere size have rotary switch units. Yale locks on panel cabinet doors prevent unauthorized access.
- For fast, simple installation, panel box has oversize wiring gutters and may be shipped separately for roughing in during early stages of construction. Interior and front are separate units, and may be installed later.

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Fig. 8—Shearing continuous rolled and polished stainless steel sheet on large squaring shear

gths stainless steel to be sold in sheet form. A modern belt polisher, which will handle sheet up to 14 ft long, also is provided to furnish the various type finishes. All auxiliary equipment has been geared to the Sendzimir mill.

The roll grinder is located sufficiently distant from other mill equipment and is mounted on a specially constructed foundation to assure best possible true mirror finish on the rolls.

A team for processing and heating requirements is generated by low-pressure

gas-fired boiler installations. Oil fired space heaters are also employed. Compressed air is supplied to the several departments from centrally located compressor room.

Modern laboratory testing equipment facilities have been located convenient to the cold mill operation but with a careful consideration with respect to the future requirements for expansion.

A relatively new technique for expediting production through the plant which has as its basis the "Produc-Trol" board, makes possible an accurate visual progress record of the status of a specific order through the various production steps.

The shipping department is serviced by the Baltimore and Ohio, and the Pennsylvania railroads—as well as by trucks.

In a dedication ceremony April 18, attended by company officials, employees and representatives of the press, the mill was christened "Gray" in honor of the mother and daughter of the company's first president. In his brief talk preceding the dedication, T. S. Fitch, Washington Steel Corp. president, pointed out as significant the plant's ability to cold reduce austenitic stainless steel about 75 per cent without benefit of intermediate thermal treatment.

In addition to Mr. Fitch, officers of the corporation are F. G. Gerard, vice president in charge of operations; G. E. Diamond, treasurer; J. H. Davidson, secretary; and J. D. Clokey, general manager of sales.



Fig. 9—One of the first shipments being loaded by fork truck. All materials handling is accomplished through use of high-lift trucks, cranes and conveyors

"PERPETUAL MOTION"

. . . conveyor system handles 1½-million lb at freight terminal

PRACTICAL adaptation of the constantly moving conveyor system pays off in more efficient handling at lowered costs in the experience of Consolidated Freightways Inc., Portland, Oreg. Part of the first unit of a \$1 million modernization program at the company's Portland headquarters, the installation required more than 2 years of planning to work out details.

The system receives freight from pickup vehicles and transports it to points most convenient for loading. Details of the conveyor system were planned by officials of Consolidated and designed by engineers of Link-Belt Co., Chicago. Particular attention was given to the peculiar needs of the terminal. Freight now moves in a continuous stream even during the busiest periods. Since the installation, an average of 1½-million lb is handled daily.

As shown in Fig. 2, the "merry-go-round" is an electrically propelled 800-ft overhead chain conveyor system moving at a constant speed of 100 fpm. On the traveling chain are 54 takeoffs in which vertical telescopic masts of 4-wheel carts are engaged. Up to 2000 lb can be loaded on each car.

In the days of hand-operated trucks the length of a freight terminal was restricted by manpower costs. On long docks too much hand trucking was out of the question. Hand trucking has been succeeded by the conveyor system, and headwork takes the place of manpower. All inbound and outbound shipments now can be more accurately checked, a practice unusually difficult under the former hand truck system.

The overall length of the building is 460 ft; one end is used for office space and the other is reserved for heavy

freight. With the conveyor system, most of the actual dock area, 80 x 400 ft 32,000 sq ft, can be utilized. There are spots for 76 trucks and trailers. Three types of equipment can be accommodated: Pickup, low bed and highway. The conveyor system involves 225 carts of various types.

Actual operation of the system has not only eliminated much lost motion but also the commotion and confusion that marked the former procedure. A cart on the conveyor requires only 8 min to make the circuit. Outgoing freight is received from pickup trucks, transferred to carts which are at once hooked onto the conveyor. There is a public address system with speaking stations in advantageous positions giving control over the system.

The carts are disengaged at points of outward loading. Blackboards on each cart indicate the loading zones and bills of lading accompany each shipment to the loading area. When freight is placed in an outbound truck, bills of lading are speeded to rating and billing office through more than a mile of 3-in. pneumatic tubes, Fig. 1.

Fig. 1 (left) —Pneumatic tube system for fast dispatching

Fig. 2 (below) —"Merry-go-round" is 800-ft overhead chain conveyor system moving at constant speed of 100 fpm



Electrode Holder Operates At Lower Temperatures

Decreases in temperature operation making possible greater efficiency and service economy, are provided by the Little David light weight, tong-type electrode holder, manufactured by Lacey Webber Co. of Kalamazoo, Mich. A combination of design and material is responsible, the maker states.

Other advantages include slip-on insulating covers, overall insulation protecting both operator and equipment and easy maintenance because of Allen head screws. Both tong and reversible slip-jaw covers of the copper bearing aluminum alloy electrode are of domed, ventilated type which provides more effective heat dissipation. Contact points on jaws are extruded from 99.9 per cent pure hard copper. Allen wrench is contained inside lower tong insulating cover when not in use.



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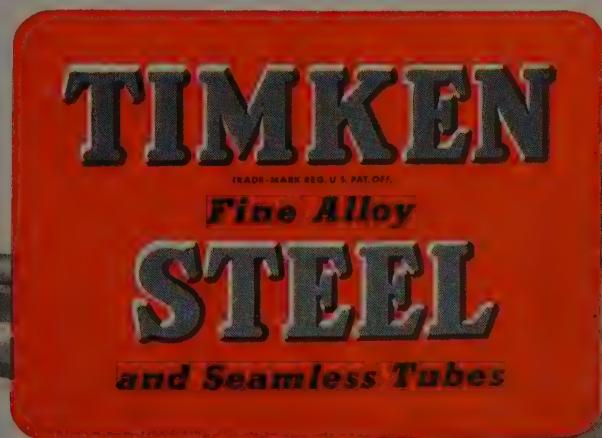
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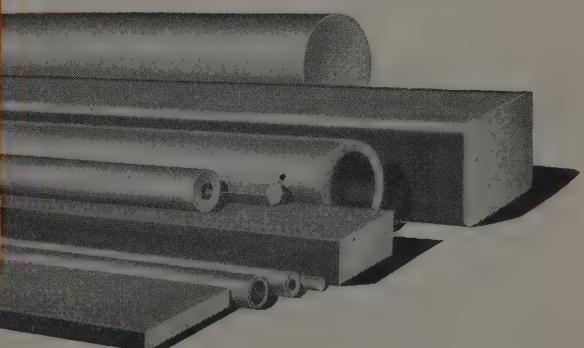
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Copper-Spun Rotors

(Continued from Page 97)

absence of fusion between copper and steel; otherwise there will be an alloying action between these elements that will cause a reduction of conductivity.

To gain a clear conception of the importance of holding alignment of slot recesses in the winding during centrifugal casting, and of the relative simplicity of a well designed winding structure, it is necessary to review briefly the procedure followed by Fairbanks, Morse & Co. in Beloit and Freeport to prepare steel rotor and stator laminations for the casting operation.

The steel, a dynamo-grade silicon strip, is all 26 gage material and is bought in widths of from $7\frac{1}{2}$ to 13 in. It is fed from uncoiling rolls to a special 150-ton Henry & Wright perforating machine equipped with a progressive die setup. As may be seen in Fig. 2, from right to left, the continuous three-die setup first blanks stator notches; then the center of the piece which is the rotor; and then 10 rivet holes and one larger hole for the notching cut are punched around edge of stator. Average run is 70 pieces per minute, rotor and stator complete. The rotor punchings and scrap produced at the second station are carried off through a drop section of the dies toward one end of the machine, while stator plates and scrap trimmed from them come out the other end, the scrap being collected in separate tote boxes at both ends of the machine.

The Henry & Wright machine produces accurately cut laminations because its two sets of feed rolls, one at either end of the machine, put sufficient tension on the strip to present a flat surface to the dies. Rolls are so synchronized that tension is released at the moment of strike.

When size of pieces to be made exceeds $12\frac{1}{2}$ in. in diameter, stock is blanked on standard blanking presses

and then slotting of the stators is done on small indexing presses.

After slotting, rotor laminations are delivered to the rotor assembly bench in groups. Here they are built up on a core (Fig. 4) and clamped in an arbor like the one at left in Fig. 1. The number of laminations and the diameter per rotor depends upon motor rating, width of core, etc., but they average about 54 laminations per inch when assembled. In assembling rotor punchings into a core, slots are skewed, as in Fig. 1, to eliminate noise in operation when installed in the motor and this results in a smoother or better torque curve. This alignment is controlled by a key on the arbor. Keyway is stamped into the laminated parts on the H & W machine.

Sinterized Surfaces Prevent Fusion

Following assembly on arbor, rotor laminations are dipped in a special solution which forms a universal coating on every component of the core. This coating prevents fusion between copper and steel during the pouring of copper and subsequent spinning. Upon heating in gas fired furnaces of our own design, the cores so coated emerge with a sinterized surface which is amenable to the molten copper soon to be cast with them but will not allow the copper to pick up iron alloys and thus reduce conductivity in the rotor.

When cores have been fully preheated, they are lifted from furnaces and placed in molds on the spinning tables shown in foreground, Fig. 5, one to each table, in a perpendicular position. Lower arm of the arbor locates itself in center hole on the table. The core is seated on several rings graduated in size to fit its shape; an air-operated locking ring holds it firmly in place. A mold whose lining is machined to required dimensions is also locked in position over the core, with the upper arm of the arbor protruding through its top. A pouring hood, five of which can be seen in Fig. 5, then encloses core, mold, and

table, and high point of the operation is reached.

The setup shown in Fig. 5 is located at company's Freeport, Ill., plant; whereas as the one illustrated in Fig. 3 is an earlier installation designed for the Beloit, Wis., plant. Although rotor casting at Beloit is carried on at a fairly high production rate, the newer Freeport division has much greater capacity due to the smaller sizes handled here. In the operation shown in Fig. 3, mold is put over core on table in foreground. Front half of this table, circular in shape, is advanced by pneumatically actuated ram onto the motor-driven turntable. Lowering of the pouring hood trips the motor switch and the drive begins. A variable-speed, direct-current motor drive is used. When centrifugal casting is used to obtain high density and ductile casting structures, the only limitation in the developed pressure is the maximum speed at which the structure can be rotated. In actual practice, copperspun rotors are produced with centrifugal casting speeds running as high as 4000 rpm, depending on size of rotor to be cast.

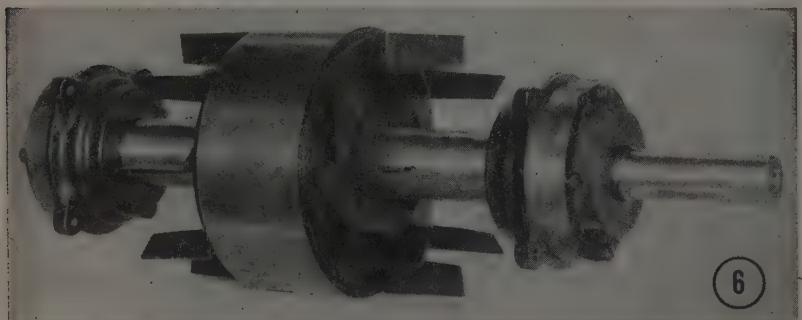
Melting of electrolytic copper at Beloit is done in a high frequency coreless induction furnace with electric power supplied by an inductor-type frequency charger set built by F-M engineers. This is a 1920 cycle unit with a 60 KW rating. It is a motor generator of sorts and really two machines in one. It is housed in a separate room for cleanliness and reduction of noise.

Molten copper is poured through the hood and through the large top opening in the mold while core is being rotated at any desired rate. Maintenance of fluidity of metal for a sufficient length of time to completely fill all recesses in the rotor and mold structure is obtained by balancing temperatures between various parts of the metal and mold structures. In other words, relationship between surfaces of the cool mold and core heated to a semiplastic state determines whether or not copper can remain fluid long enough to fill all voids in core before it solidifies.

High frequency induction furnaces for melting copper, have proved excellent vehicles for the control of metal temperatures and maintenance of chemical purity.

After coming from the spinning operation the rotors are allowed to cool to room temperature. The arbor shown in left-hand view, Fig. 1, is removed on a hydraulic press to leave the cast rotor as in middle view. At right in Fig. 1 is same rotor after rough machining. Rough machining is done on lathes in conventional turning operations with very slight removal of stock, purpose being to give piece a uniform surface. Final machin-

Fig. 6—Finished copperspun rotor equipped with separately mounted fans. This permits overall machining of rotor before installation of fans and insures improved dynamic balance



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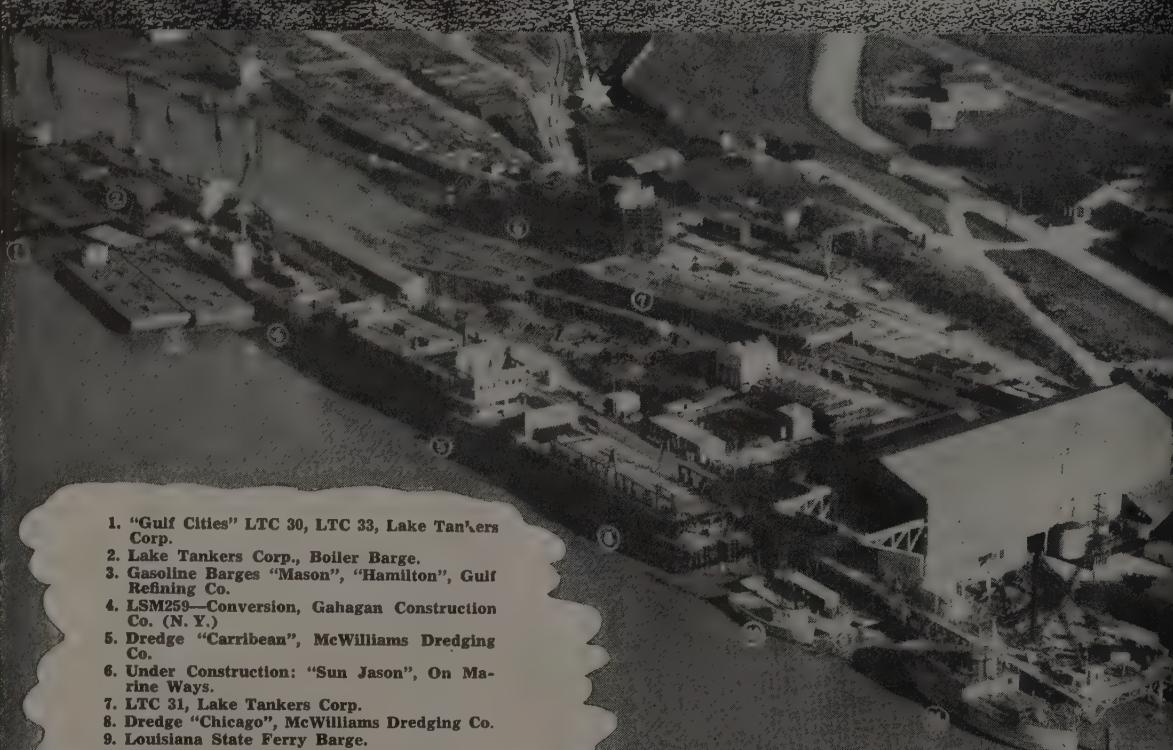
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g takes place on grinding machines which give the rotor the appearance to be seen in Fig. 6.

Many different types of rotor construction have been used through the years. Some of the earlier types were designed with rotor bars soldered to circular end rings; some were made with bars bent and riveted together on each end. One type of rotor was a modified cast en bloc design in which copper bars were inserted in the rotor slots and the end ring cast around the extension of each bar. Other types of rotors using copper or copper alloys employ rolled bars, brazed with bronze or silver, soldered to brass or copper end rings.

One-piece cast en bloc squirrel cage windings have been in production for over 25 years, with several different methods of casting in use—gravity casting, pressure casting of one form or another, and centrifugal casting. Majority of rotors built by these methods used aluminum or low temperature alloy metals. The use of copper and copper base alloys in the one-piece en bloc motors has been successfully produced only in the last few years.

Shrinkage allowances for cast copper, thermal expansion, and modulus of elasticity all favor the use of copper over aluminum. As a result, the problem of shrinkage and stress concentricity in the one-piece copper rotor is much less pronounced even though casting temperatures are practically doubled. Rotors could be designed with large fillet radii between the bars and end rings to give maximum ruggedness and strength. The high conductivity of the copper rotor with the resultant increase of magnetic attractions gives greater freedom in the design and shape of the rotor slot.

Requirements for momentary fluidity in cast en bloc structures, as previously men-

tioned, accentuates the possibility of fusion between steel and copper with the ultimate detriment to the electrical characteristics of the copper windings. Thus means must be provided for the prevention of fusion and pick-up of chemical impurities. This is accomplished in the coating operation already described by sintering a silicate surface to the laminated core and by designing the molds with nonferrous surfaces which come in direct contact with the molten metal. This is particularly important where there is a flow of metal over the surface.

Control of Fusion Absolute

The attainment of the control of fusion in the copper-spun rotor is evidenced by conductivity in the cast structure of the order of 90 per cent that of pure copper, nearly twice the conductivity of the purest aluminum. The high conductivity of the copper-spun rotor is also a factor in obtaining reduced stray load losses. The selection of slot combination is, of course, one of the major factors in control of stray losses, but since the use of high conductivity material permits a maximum freedom of design, the shape and number of slots can be selected to best advantage. Further, stray load losses due to surface currents in the squirrel cage winding are reduced in proportion to the increase in conductivity.

It is possible to design the mold and casting structure to provide fans cast integral with the rotor, but the copper-spun rotor is equipped with separately mounted fans. This permits complete overall machining of the rotor and provides improved means for checking the quality of production and improving the dynamic balance of the finished product.

The performance record of the copper-

per-spun rotor is impressive. Its ability to stand up in service of the most severe type has been demonstrated. One example is its application to reversing duty where rotor troubles largely predominate. The slightly higher weight of copper is more than offset by the increase in ruggedness and strength and the ability to withstand higher rotor temperatures. Further the inertia of the rotor, which is a major factor in the application of motors to reversing service, is more dependent on the diameter of the rotor than on the weight, since the inertia is proportional to WR^2 , which means that a reduction in diameter to obtain lower inertia is much more important than any slight reduction in weight.

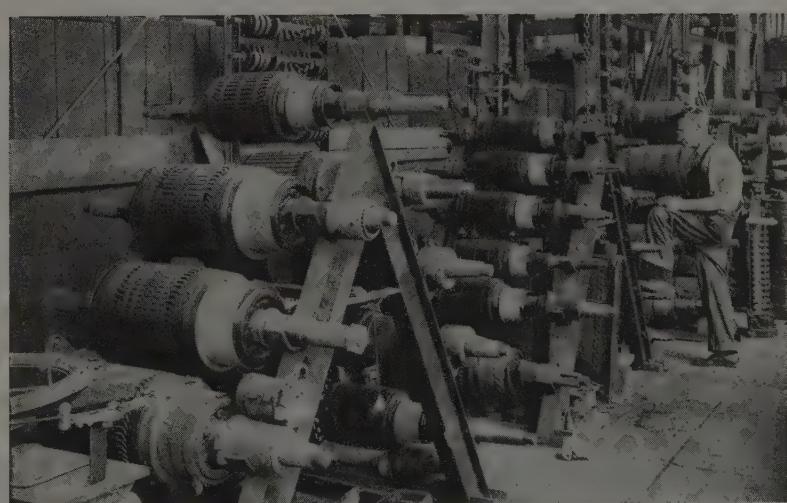
The salient features of the rotor which bears the name Copperspun and is produced by the technique described in this article can be briefly summarized as follows:

- (1) A high strength rotor with a dense and ductile, one-piece copper squirrel cage winding;
- (2) a rotor winding with a high melting point and no joints;
- (3) one which has a low coefficient of expansion;
- (4) one with high conductivity;
- (5) one of low porosity, centrifugally cast; and
- (6) a true running rotor—finished machines—dynamically balanced.

—o—

Designing of cams, tappets, valve springs and other valve gear units for internal combustion engines is the subject of a comprehensive treatise published recently by Eaton Mfg. Co., Detroit. Written by Michael C. Turkish, cam design engineer and mathematician for the company's Wilcox-Rich division, the book covers the whole field of cam design and includes chapters on springs, the observation of valve gear motion and miscellaneous valve gear studies.

MOTOR MAINTENANCE: All but the largest electrical units used in Scullin Steel Co.'s St. Louis mill are rewound in the company's own electrical repair shop. Here are kept a large stock of spare Fiberglas-rewound coils and armatures for virtually every motor, making it possible to change an armature anywhere in the mill in less than an hour's time



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A PENTON PUBLICATION



Silver Brazing

(Concluded from Page 99)

served that some operators move one brazed surface against the other while the brazing alloy is in molten condition and before the heat is withdrawn. In extreme cases, operators who cannot move such parts while under the brazing heat, pre-tin one or both parts with silver brazing alloy to make sure of getting a higher strength joint. With proper preparation and proper use of the correct flux, such extra attention should not often be necessary.

Procedures followed by a company brazing brass tubing into the thin stainless steel sheet of an evaporator indicates importance of mechanically cleaning, followed closely by fluxing the joint area. In addition, there is a special heating problem; brass is a high conductor of heat and stainless steel is a low conductor. Therefore, great care must be taken not to overheat the stainless. This means that the heat must be applied to the brass tubing first, with practically no heat directly on the stainless steel. It will pick up enough heat locally from the side flare of a torch flame to bring it up quickly to the necessary 1200° F.

It is common practice on this job to put

a 1/16-in. wire ring of the silver brazing alloy around the 5/8-in. ID brass tube about 3/8 or 1/2-in. above the joint. Fluxing the ring and the brass tube below it, and the joint area around the tube on the stainless steel is the next step. Using a split inductor coil or a 2-flame oxy-gas tip, quickly heat the end of the brass tube until the brazing alloy melts and runs down onto the stainless steel flowing out onto it to form a nice fillet.

By this procedure the stainless is up to 1200° F brazing temperature for a few seconds, avoiding over-oxidizing or otherwise injuring the stainless. The low temperature, quick braze avoids injurious amount of carbide precipitation in the stainless steels, especially if the heated area is cooled rapidly to below 800° F immediately after the alloy sets.

Problem at another company involved the brazing of small, curved, stainless steel blades to a flat surface of a disk to form aircraft engine fuel pump impellers. The stainless alloy involved here is known as type 416. As Fig. 1 shows, this job required that these small curved blades be carefully located and their edges be fillet brazed to the surface of the impeller disk.

Preparation and the jigs were the secrets of the success of this job, which was in production for over 4 years. First,

the parts were very carefully chemically cleaned, washed, degreased and fluxed. A washer of the silver brazing alloy 0.005-in. thick, the same diameter as the stainless disk was degreased and coated with flux on both sides. Then it was placed on the disk and the disk and brazing alloy were assembled in a heat resisting jig containing groove which carefully located the blades on top of the washer. After the flux dried, the assembly was sent through a controlled-atmosphere electric furnace operating at 1450° F. This was a continuous belt furnace with a cooling chamber.

Success of this rather intricate job on an alloy difficult to braze depends entirely on the amount of care observed and carried out in the preparatory steps. Each step is vitally important down to the last detail. The cleaning operation means that all surfaces to be brazed are cleaned down to the pure metal. These parts have to be degreased to remove any possible oil picked up through handling or from the atmosphere.

Next they must be immediately fluxed to protect them as the oxide forms rapidly. If the parts are still warm from degreasing, the flux will dry rapidly and the assembly can be moved into the furnace within a few minutes. If all these steps are carefully and rapidly followed, and the furnace is operated at the correct temperature with a reducing atmosphere, parts should come out properly brazed 99 times out of 100.

The following technique was used in a case involving the brazing of the machineable type 303 stainless steel to type 304. These were radio antenna parts which had to withstand both corrosion and high stress. In the brazing of stainless steel machined fitting to a tube it was found best to pickle in nitric acid solution, wash, and then sand blast. After degreasing, Handy flux was carefully applied to both surfaces to be brazed and these surfaces were moved against each other in order to distribute the flux between them evenly.

Next, this company made a point of heating evenly in their induction heating coils by using larger coils, more turns and slower heating. Instead of having one turn of a coil within 1/8-in. of the piece, a more even heat was obtained by having three coils about 1/2-in. away from the parts to be brazed. This resulted in a slower, but more even heat. In turn, this prevented the fast over-heating of the outer wall of the joint while the inner wall was coming up to heat. In addition to this heating method, it was found to be a definite advantage to turn or rub the two surfaces to be brazed while the silver brazing alloy was molten, thus helping to wet it smooth over the entire joint area.

NEW LITERATURE

SLIDE FILM EXPLAINS X-RAY DIFFRACTION

By North American Philips Co. Inc., 100 East 42nd street, New York 17. Contains twelve illustrations and text material.

DESMOND DIAMOND TOOL REFERENCE GUIDE

By Desmond-Stephan Mfg. Co., Urbana, O. Four-page illustrated bulletin No. D-8 gives full dimensional data and prices on Tru-set diamond tools and nibs.

TRANSMISSION BELTING

By Hewitt Rubber division of Hewitt-Robins Inc., 240 Kensington avenue, Buffalo 5. A four-page bulletin outlining specifications and construction features of Monarch brand transmission belting.

WIRE AND METAL FILTER CLOTH, FABRICATED STRAINERS

By Michigan Wire Cloth Co., 2100 Howard street, Detroit 16. Contains complete specification tables of industrial wire cloth; a tabulation of characteristics of metal filter cloth and a guide or check list covering strainer design.

STOCK LIST

By Abary Steel Co., Perth Amboy, N. J. Booklet contains changes and simplifications of stock sizes the Department of Commerce recommended recently. Features thumb index for eight sections.

BLUE BOOK OF STAMPING MANUFACTURERS

By Pressed Metal Institute, Cleveland. Second edition. Directory divided into three sections: Alphabetical list of Institute

members both active and associate; geographical breakdown of membership and facilities list of active members.

PRINCIPLES AND PRACTICE OF FLOW METER ENGINEERING

By Foxboro Co., Foxboro, Mass. Book, based on reports from users, contains up-to-date flow meter data. Price, \$3.

OVER RUTS AND HOLES

By Stonhard Co., 408 North Broad street, Philadelphia 8. Folder outlines overlaying or patching of worn concrete, wood, brick or composition floors with Stonhard resurfer. Several typical installations are described and illustrated.

FERRO-THERM STEEL INSULATION

By American Flange & Mfg. Co. Inc., 30 Rockefeller Plaza, New York. Bulletins describe this "reflective" insulation—so-called because it makes heat "bounce" from either side.

SUPERIOR SPUR-GEARED HOISTS

By David Round & Son, Cleveland. Leaflet gives detailed specifications on 18 standard models, ranging from 1/4 to 20 ton capacity. Each model is individually illustrated and sectionalized drawings are used to show construction features.

RAZOR BLADE MACHINERY AND EQUIPMENT

By Excel Automatic Products Inc., 57-59 Twelfth avenue, Newark, N. J. Booklet shows photos and describes equipment for stamping, lacquering, plating, etching, grinding and packaging.

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Electroplating

(Concluded from Page 102)

verse-current plating may not be evident at the normal operating conditions of the bath. By changing such factors as temperature, metal concentration, and pH, even greater improvement can be secured with reverse current.

Quality of Plate: Figs. 6 and 7 are typical examples of the comparative microstructure of metal plated using the two methods. The photomicrograph in Fig. 6 shows a pore in a high-speed copper-plated part. The interesting point in this photograph is the series of dark lines parallel to the base metal. It might be assumed that periodic reverse-current would produce such lines. Actually, the opposite is true. Fig. 6 was produced by regular continuous direct-current plating in a high-speed copper-cyanide plating bath, and in Fig. 7, the same bath was used, but the current was reversed periodically (3½ sec cathode, ¾-sec anode). The uniform structure of this latter deposit is quite apparent, and the absence of the dark lines, which are characteristic of many bright plating processes employing direct current is noteworthy.

In another example where bright metal surfaces are normally produced by several polishing and plating operations, the cost of finishing had generally exceeded the cost of the plating. A detailed cost analysis of the production of one highly polished part, both by direct-current and periodic reverse-current electroplating is presented in accompanying table.

	Direct Current	Periodic Reverse Current
Burr and Brush	0.0313	0.0313
Polish Edges	0.0300	.....
Polish Top	0.0093	.....
Spot Polish	0.0093	.....
Copper Plate	.....	0.0300
Copper Polish	.....	0.0600
Nickel Plate	0.0246	0.0200
Nickel Buff	0.0786	.....
Nickel Color Buff	0.0235	0.0235
Chrome Plate	0.0139	0.0139
Chrome Color Buff	0.0246	0.0246
TOTAL PLATING AND FINISHING	0.2451	0.2033
Unplated Part	0.0946	0.0946
TOTAL COST	0.3397	0.2979

All figures in cents.

By use of the new process, the total cost is reduced from 0.3397 to 0.2979 cent or a decrease of over 12 per cent. Finishing costs that are approximately 25 cents in the direct-current method, decrease to slightly over 20 cents or a saving of roughly 20 per cent when the reverse-current method is used and the product has better metallurgical characteristics and a finish fully equal to that obtained by the older method. Even better savings are expected in the future when the full advantages of the method are realized. It should be noted that certain polishing procedures were retained when the newer process was used. This is because while high degrees of polish can be achieved through periodic reverse-current plating, sometimes it is more economic to give a final color buff to achieve the high luster required for certain finishes.

Advantages: While periodic reverse-

current plating is not a panacea for plating ills, it has already proved its to be an exceptionally worth-while to in some very large copper-plating establishments in this country. In general it may be expected to do one or more the following things:

- (1) Increase the rate of plating.
- (2) Increase the density of the metal deposited.
- (3) Improve the brightness of the surface.
- (4) Apply plated metal of greater smoothness than the base metal.
- (5) Allow heavier deposits.
- (6) Decrease porosity.
- (7) Provide better metal distribution.

The process is somewhat flexible and any one feature can be emphasized more than some of the others. Ordinarily, it is not possible to secure all these benefits at their maximum at any one time.

Formed Metal Plumbing Fixture Standard Offered

A recommended commercial standard for metal porcelain enameled sanitary ware, number TS-4360 is being circulated for review and comment by the National Bureau of Standards, U. S. Department of Commerce, Washington.

Proposal, initiated at the request of the Formed Metal Plumbing Ware Association, embodies recommendations of leading organizations in the industry. It was adjudged to be the consensus of suggestions from representative distributors, testing laboratories, government agencies and consumer organizations.

Multiple Exposure Chart

(Concluded from Page 104)

tensity at the distance for which the original chart was constructed are found by the inverse square law. Assuming that the original chart was drawn for a focus-film distance of 35 in., at 48 in. the $\frac{35 \times 35}{48 \times 48} = 0.53$ that at

35 in. In other words, all exposures at 48 in. must be multiplied by the reciprocal of 0.53, or $\frac{1}{0.53} = 1.9$, to give the

same density. If the sliding scale is positioned so that the line for 1.9 milliampere-minutes is coincident with the mark for 1 milliampere-minute on the temporary scale at the left, exposures at 48 in. focus-film distance may be read off directly.

When all the necessary marks for positioning the sliding exposure scale have been made, the temporary exposure scale on the left edge of the chart may be re-

moved. It should be preserved, however, in case it is desired to add further information to the chart.

High-Volatile Coal Made Smokeless by New Heater

Practical field tests of commercial models of a new smokeless heater, developed through research by Bituminous Coal Research Inc., Pittsburgh and a group of 18 stove manufacturers, are being undertaken in four major cities. According to the research organization, the heaters are giving smokeless performance with high-volatile coals, are trouble free in operation and require less manual attention.

In its present size, the heater is designed to operate for 12 hours without attention, yielding an average of 35,000 Btu per hour. For shorter periods it will burn up to 6 lb of coal per hour with a corresponding increase in heat. The present design embodies principles

developed for this agency by Battelle Memorial Institute, Columbus.

Seven of the co-operating stove manufacturers have ordered heaters of the type for use in their own development work. Two others have adapted laboratory findings to commercial designs being consumer tested. It is expected that they will be produced in quantity shortly.

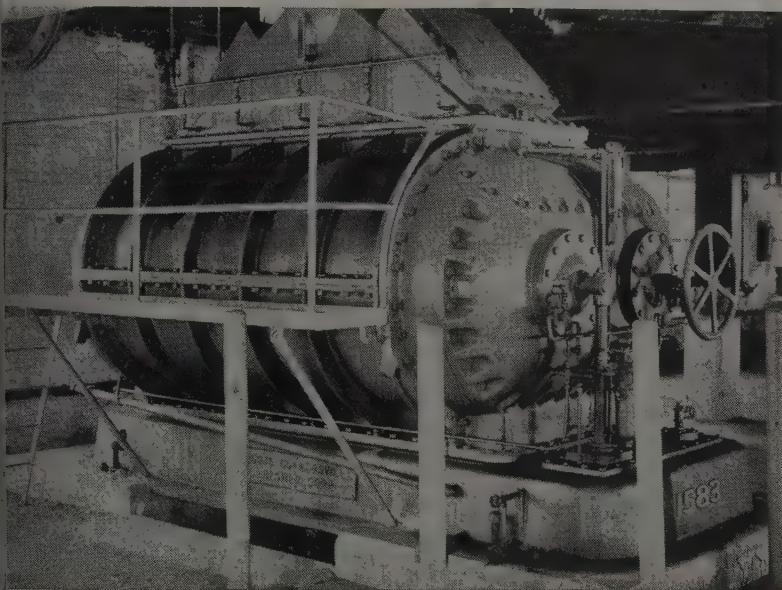
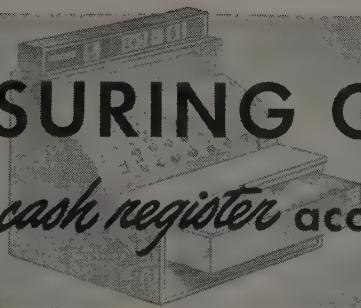
Commercial Gas School To Be Held by AGA in May

The American Gas Association commercial gas school, instituted by the Industrial and Commercial Gas Section of that body, will be held in Washington May 12 to 16.

Employees of gas companies, gas equipment manufacturers and gas equipment dealers are eligible for registration at the five day seminar, which will consist of lectures on commercial gas cooking equipment, how it is sold, installed and operated.

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You'll get just that kind of accurate measurement with Roots-Connersville Positive Displacement Meters. That's because:

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5. Accuracy is permanent because measuring chambers are surrounded by precision-machined cast-iron surfaces.

Other advantages of R-C Meters include: negligible operating cost, small space requirements and continuous, dependable performance.

For accurately measuring production, consumption or delivery of gas and for interdepartmental accounting, you can count on the cash-register accuracy of Roots-Connersville Positive Displacement Meters. For detailed data, ask for Bulletin 40-B-14—free, of course.

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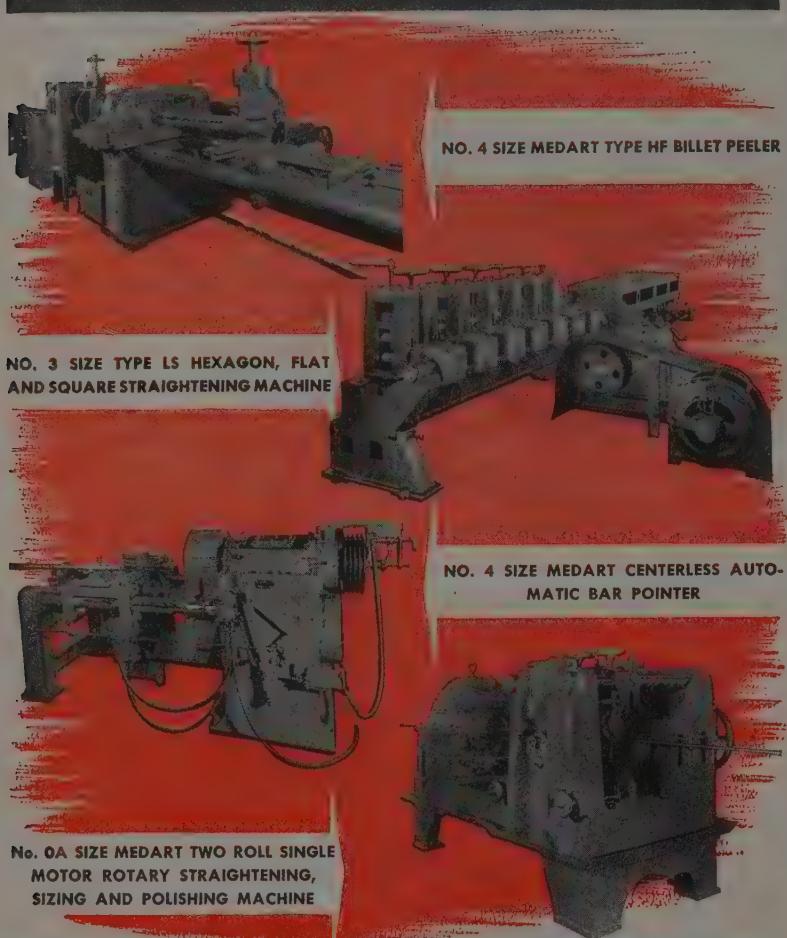
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One Way to Produce a Cam

(Concluded from Page 108)

can be followed by referring to the assembly illustration.

To use the attachments, with the saw in position, the operator first makes a slit with the saw from the outer face of the cam blank until it meets the contour line. He then places the chain "H" around the outer surface of the holder and attaches the chain to one or two of the pins "L", resting his foot on the pedal "M" to free the chain from tension.

When the cam holder is in the desired position, the operator releases his foot from the pedal and the weight "H" forces down the lever, exerting tension on the cable and chain to hold the cam blank firmly against the moving saw. The man then can feed along the blank saw the desired contour.

When the worker wishes to change the position of the holding chain he presses down the lever by pushing down on the pedal "M" which raises up the rear end of the lever and removes the tension.

With this attachment the man has both hands free at all times to guide the blank against the moving saw. Work is done accurately at a low production cost, a with perfect safety to the operator.

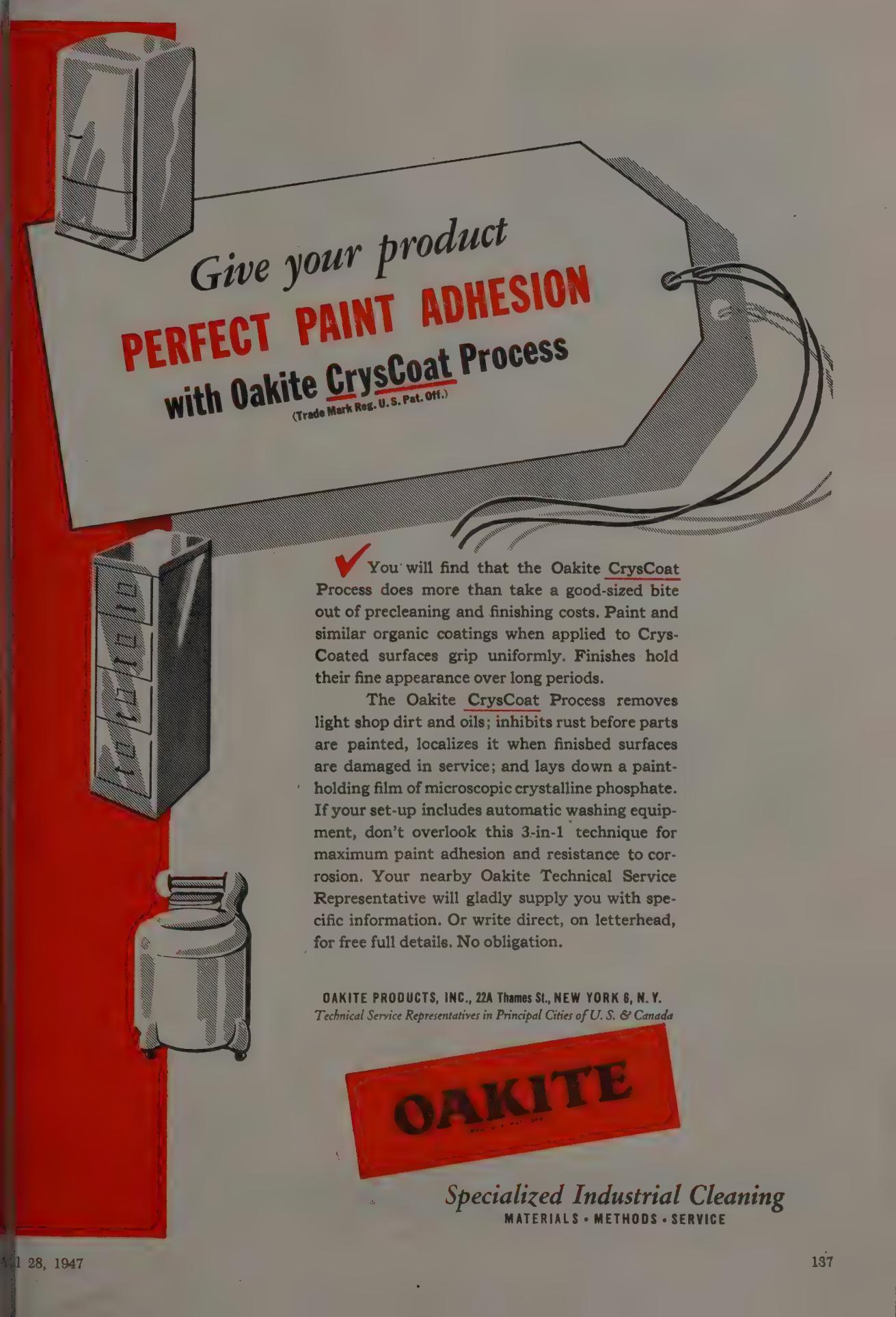
After the cam is cut it is only necessary to smooth off the sawed edges which is done on a Do-All filing machine and the cam is ready for hardening and placing into service.

New Tractors, Graders Incorporate More Power

Production of two diesel engines, 70 and 105 hp, two track-type tractors and two motor graders powered by the engines is announced by Caterpillar Tractor Co., Peoria, Ill. Increased power and new and stronger materials are incorporated into the new machines, the 4-cylinder D315 and 6-cylinder D6 engines, the D4 and D6 tractors and the No. 12 and No. 112 graders, company states.

Power increases in the two engines are reflected in the greater work capacity in the tractors and motor graders with diesels power. Both engines are available as industrial units, electric sets and marine engines.

Sixty-five drawbar horsepower and belt horsepower, an increase of 10 per cent over comparable figures for the previous model, are developed by the D6 tractor. The D4 tractor develops 43 and 55 drawbar and belt horsepower, respectively, a 20 per cent increase in power.



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✓ You will find that the Oakite CrysCoat Process does more than take a good-sized bite out of precleaning and finishing costs. Paint and similar organic coatings when applied to Crys-Coated surfaces grip uniformly. Finishes hold their fine appearance over long periods.

The Oakite CrysCoat Process removes light shop dirt and oils; inhibits rust before parts are painted, localizes it when finished surfaces are damaged in service; and lays down a paint-holding film of microscopic crystalline phosphate. If your set-up includes automatic washing equipment, don't overlook this 3-in-1 technique for maximum paint adhesion and resistance to corrosion. Your nearby Oakite Technical Service Representative will gladly supply you with specific information. Or write direct, on letterhead, for free full details. No obligation.

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Expect the most from Mobilcranes, for here are sturdy, powerful machines incorporating proved advancements in design and construction. Pioneering the very features that have become standard for the industry, OSGOOD and GENERAL have developed, in Mobilcranes, smooth-working, efficient units that

will handle the biggest jobs in record time.

Whatever your materials-handling problem, you'll find that OSGOOD and GENERAL Mobilcranes—one-man operated, one-engine powered, mounted on rubber—can do the job at a savings in time, money and manpower.

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Magnesium Alloys

(Continued from Page 106)

direction to counteract circumferential compression stress set up as the punch enters the die, which otherwise would cause the sheet to pucker.

Square or other irregular shapes concentrate material flow in a manner which complicates holdback requirements considerably. In cases of this type, draw beads, or preferably blank developer are used to obtain nonuniform restraint to compensate for unequal deformation requirements. Other factors such as drawing radius, blank size, temperature, type of material being formed, blank thickness and effectiveness of lubrication further complicate the problem.

In actual practice pressures on the restrained portion of the blank varied from the feasible minimum up to 7000 psi. Most jobs, however, require pressure ranging from 50 to 200 psi.

The 2 to 4 fpm speed often obtained with the usual hydraulic presses has been found to be the most satisfactory range for forming magnesium. Advantages of faster press speeds than 4 fpm have been discussed in the section on presses. The only time a speed slower than 2 fpm is required is when a water-cooled punch used in making a very deep draw. In this case the speed should be less than 1 fpm to provide time for cooling the sheet.

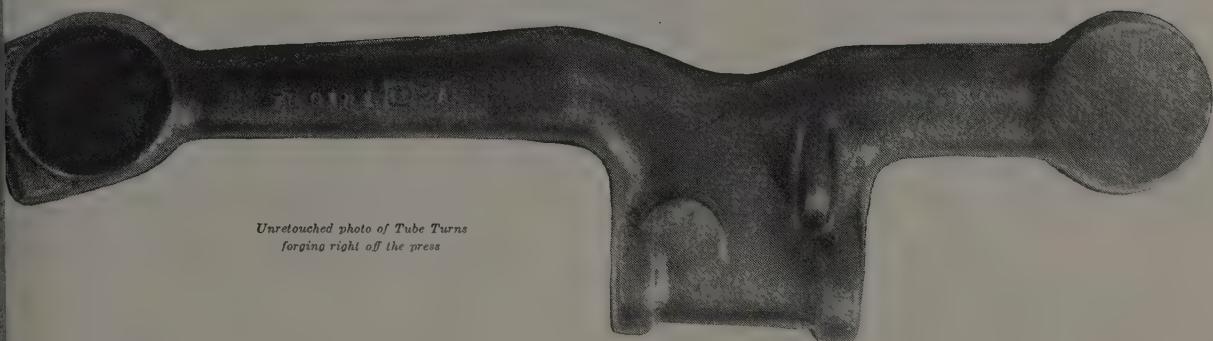
Rubber Forming: Shallow parts such as aircraft ribs, spars and fairings which do not require drawing action are normally rubber formed by the Guer process developed by Douglas Aircraft Co. Inc. While the labor cost per piece is higher than for die-formed parts, savings on die cost and speed with which dies can be produced or revised overcome this disadvantage, especially when only a limited number of parts are required.

Special compounded natural and synthetic rubbers which may be used will be heated up to 450°F (230°C) very satisfactorily have been developed. Slabs of rubber, in hardness of about 60 Durometer, are cemented together to form a pad about 6 in. thick in the same type retaining box used for ordinary cold rubber forming. For average forming, a box for a given press should be limited to a size which will enable a pressure of 1000 psi minimum to be applied on the rubber pad.

Blocks for hot rubber forming are made from metals with melting points over 1000°F (540°C). Metals with melting points lower than 1000°F were found to creep excessively when subjected to the heat and pressure used in the operation. Magnesium alloys, either machine from plate or cast shapes, have proved most satisfactory because no allowance



A penny saved is Big Money



*Unretouched photo of Tube Turns
forging right off the press*

When it comes to forgings of this type in mass-production quantities, a penny or fraction of a penny saved per piece can amount to a young fortune in total money saved.

Such savings are made possible by TUBE TURNS smoothly coordinated forgings production system. Every operation involved has been organized to keep pace with the speed of TUBE TURNS high-speed mechanical presses and upsetters.

TUBE TURNS' progressive die designing, die making abilities and modern equipment give you forgings that come close to machined tolerances, as forged. And there you have another saving—in pounds of metal required, in manpower needed to finish the job, in wear and tear on your machine tools.

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for SYNCHRONOUS MOTORS



STANDARD 2300 AND 4600 VOLT STARTER
WITH DISCONNECT SWITCHES



STANDARD 220-550 VOLT STARTER
WITHOUT DISCONNECT SWITCHES

Complete Units -- Push Button Operated

with automatic field application by Polarized Field-Frequency Relay

WITH all internal wiring complete, and totally enclosed, these EC&M unit-type Synchronous Starters provide a quick, low-cost installation. They are shock-proof and do not require an expensive control room. Mounting them out in the plant, alongside the motors they control, keeps the length of heavy cable between motors and starters at a minimum, particularly those designed for reduced voltage starting.

All starters are of the push button, magnetic type arranged to start the motor as a squirrel-cage motor, and then apply direct current field excitation when the motor has attained a speed most favorable for synchronizing. The Polarized Field-Frequency Relay operates automatically to pull the motor into step without pole slippage, with minimum current and maximum synchronizing torque.

Being sensitive to motor speed, the relay also operates to remove the field, should the motor pull out of step due to a dip in voltage or to an overload. If the motor has adequate torque to re-accelerate the load up to synchronizing speed, re-synchronization occurs automatically.

Write for Bulletins 1075-B, 1076-B, 1077-A and 1078-A

THE ELECTRIC CONTROLLER & MFG. CO.
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has to be made for expansion differences. Magnesium alloys heat rapidly, are light and are very easy to machine.

Various methods may be used to keep heat on the metal while it is formed. Method used most extensively involve the use of an oven to supply required heat. A blank is located on a forming block by means of 3/16-in. diameter or larger pins. The loaded block is brought to temperature in an oven, after which it is formed in the usual manner. The forming platen should be insulated to prevent rapid chilling which would occur if the heated dies were placed on a cold steel platen.

Hand Forming: The necessity of working magnesium alloys at elevated temperature makes hand forming a much more difficult operation than it is in materials which can be worked at room temperature, therefore this method is used only where a comparatively few units are required. The same technique is used in working magnesium, however and with experience an operator can make quite difficult parts by this method.

Simple bends are made by clamping the material in a soft-jawed vise or to a block, and making the bend with a soft hammer. Form blocks may be made of a heat-resistant wood such as birch, although metal is usually preferred. Heating is accomplished by means of a torch. Temperatures are checked with a hand pyrometer. In some cases where metal form blocks are used, heating is accomplished by placing the form block and sheet in an oven or by mounting electric heaters in the form block and heating the sheet by conduction.

Straight short radius bends in sheet are made in dies by rubber forming, and by means of a press brake. Die and rubber forming methods are used in flanging class operations where bends at right angles to each other would complicate press brake operation. Various standard steel dies plus dies in which the upper blade is bottomed in rubber retained in a U-shaped bottom die are used in brake processes. Press brake dies are heated by electric strip heaters as the flat surfaces presented by this type too are ideal for the application.

Heaters are not used on a female die which contains rubber. It is recommended that dies be insulated from the press to shorten heating time, to prevent the press from heating excessively, and to conserve heat. Insulation of the bottom die may be effected easily by placing the insulating material between the press bed and bed rail. It is more difficult to insulate a top die; therefore a special blade holder incorporating insulation is provided for the press. High compression type insulating materials which may be obtained in sheet form, such as those used in friction blocks should be used. The holder may be



"to the industry
of which he is a part."

... THEODORE ROOSEVELT



Falk Trainees of Today Can Well Be the Leaders of Industry Tomorrow

● Twenty years ago we said, "To build a better product, first improve the man."

This axiom, a self-evident truth, has been verified and repeatedly justified by the broad, national acceptance of the apprentice-training theories first established and implemented . . . and continually developed and fostered . . . by Falk, these theories developing into a system and now widely known as the Milwaukee Apprentice Training Plan.

Today, after the time-test of experience, we say, "Through this training program, Falk is preparing men for responsible positions throughout the industrial world and is safeguarding the industry of which it is a part by providing it with skilled men."

The entire Falk training program is based upon the simple belief that only by the unselfish development of the whole

can the selfish progress of one part be assured.

Falk's own interest is first, the development of better men; and second, the building of better products.

The Falk plan of apprentice training in draftsmanship, electrical maintenance, steel foundry, sheet metal, pattern making, welding and machine shop practice is further augmented by graduate engineering and college cooperative training programs.

These programs are vital to the further improvement of the industry devoted to the manufacturing of geared and coupled power transmission; to the betterment of all Falk men; to the improvement of Falk products; to the enhancement of the Falk name as "a good name in industry," and to the supplying of improved skills, better products, and greater service to all Falk customers.

THE FALK CORPORATION • MILWAUKEE 8 WISCONSIN

Precision manufacturers of Speed Reducers . . . Motoreducers . . . Flexible Couplings . . . Herringbone and Single Helical Gears . . . Heavy Gear Drives . . . Marine Turbine and Diesel Gear Drives and Clutches . . . Steel Castings . . . Contract Welding and Machine Work. District Offices, Representatives, or Distributors in principal cities.

FALK
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Here's how Falk Steelflex Couplings completely protect

connected machinery

from Shock...

Vibration...Misalignment

Only Falk Steelflex Couplings provide all three: Flexibility, Torsional Resilience* and Applicability to 90% of all industrial requirements.

These three factors are important to the coupling buyer. They offer him positive protection to connected machinery . . . the certain solution to applications where shock loads, misalignment and vibration are problems . . . and the opportunity of stocking one type of coupling to meet practically all of his coupling requirements, quickly and conveniently.

How Falk Steelflex Couplings are designed and produced to provide these factors is important. The diagrams on the opposite page explain how the Falk "grid-groove" design functions to protect machinery against ordinarily damaging conditions . . . how it compensates for parallel and angular misalignment and permits free end float.

A simplified method for selection, load classifications, service factors and dimensions is available to you in a booklet. You are enabled to meet your requirements dependably, quickly—with a reduced parts inventory.

In addition to the standard Type "F" which is applicable to more than 90% of all installations, Falk offers a line of other Steelflex couplings and couplings featuring the Steelflex principle but used for special service and dual-purpose applications.

Get the complete information on Falk Steelflex Couplings from your Falk representative or distributor, or write to:

* Torsional Resilience is the ability to spread the peak or shock over a relatively long increment of time, thereby greatly reducing stresses in the connected machinery.

THE FALK CORPORATION
MILWAUKEE 8 WISCONSIN

For over fifty years precision manufacturers of Speed Reducers . . . Motoreducers . . . Flexible Couplings . . . Herringbone Single Helical Gears . . . Heavy Gear Drives . . . Marine Turbine and Diesel Gear Drives and Clutches . . . Steel Castings . . . Contract Welding and Machine Work. District Offices, Representatives, or Distributors in principal cities.

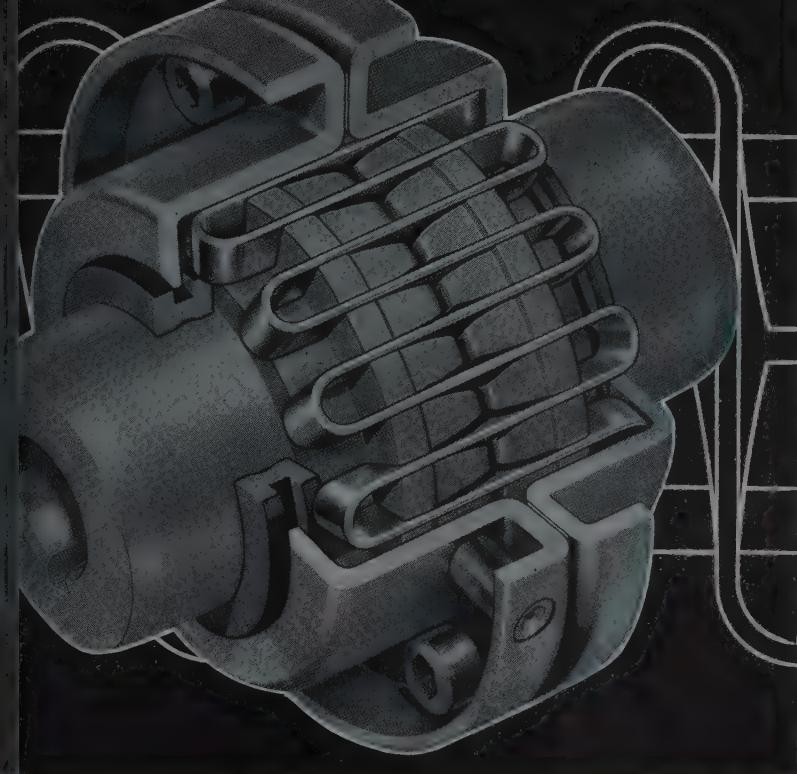


Fig. I

Fig. II

Fig. III

Fig. I. Grooves, in a precise arc, and with a radius and length proportional to the capacity of the coupling, are cut into two identical hubs of moderately high carbon steel—forged of Falk alloy cast steel . . . Fig. II. These grooves provide a slot for a grid member made of chrome alloy steel with an elastic limit of 180,000 pounds per square inch and an ultimate strength of 220,000 pounds per square inch . . . Fig. III. This grid fits snugly into the curved grooves cut into the hubs of the coupling. The grooves provide a scientifically cut bearing surface for the grid. This bearing surface extends from the outer to the inner edge of the grooves. The grid bears on the grooves in proportion to the load . . .

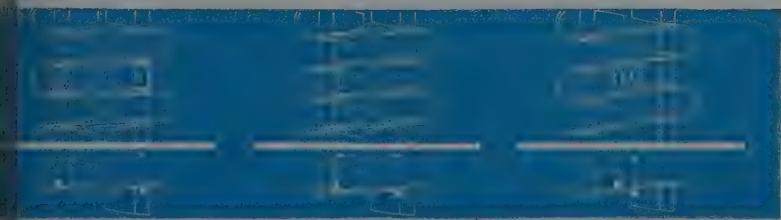


Fig. IV

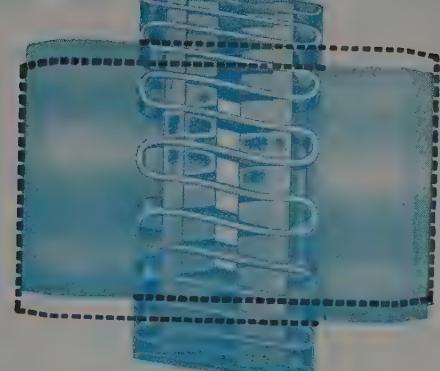
Fig. V

Fig. VI

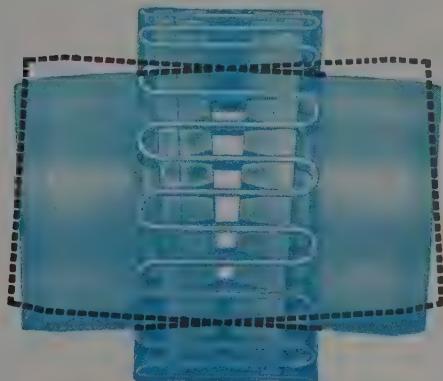
Fig. IV. Under light loads, the grid bears only at the outer edges of the grooves. This permits a long, free, elastic span between the outer edges of both hubs. Power is transmitted through almost the entire length of the grid rung . . . Fig. V. Under normal loads, the grid bears on a larger area of the grid grooves and the span of the grid rung is shortened. It transmits more power and maintains its capacity to absorb shocks and dampen vibration . . . Fig. VI. Under peak loads, the grid rungs bear over almost all of the curved surfaces of the grooves. The span of the grid rung becomes very short. Under the impact of shock loads the grid flexes and continues to transmit power smoothly.

FALK

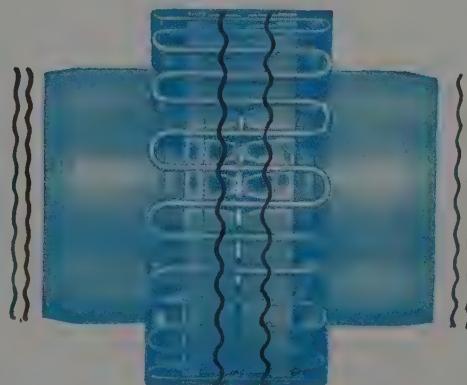
...a good name in industry



Parallel Misalignment. When parallel misalignment is involved, the grid-groove combination comes into full play. The movement of the grid in the lubricated grooves accommodates the misalignment, while still permitting full functioning of the grid-groove action of the coupling in absorbing shock and dampening vibration.



Angular Misalignment. Under angular misalignment the design of the Falk Steelflex Coupling permits a rocking and sliding action of lubricated grid and hubs that allows the greatest freedom of accommodation to angular misalignment, while at the same time transmitting the power through the resilient grid.



Free End Float. Because the grid member slides freely in the lubricated grooves, the Steelflex coupling permits unrestrained end float for the shafts of both the driving and driven members, or of either one. If it is desired that end float be restricted, provision can be made to limit it to any required amount.

**from casting
quality . . .**



**to contour
and spacing
precision . . .**

**FALK step-by-step control
insures dependable
gear performance**



- Every operation in the manufacture of Falk high-speed precision gears . . . from raw material to finished product . . . is under one control.

The Falk foundry is noted for the quality of its steel. Production versatility ranges from very simple to the most intricate castings . . . from very small to some that weigh as much as 100,000 pounds.

Cast steel must pass rigid microscopic examination at more than 5000 diameters in the Falk Metallurgical Laboratory.

Extremely accurate machining and finishing of Falk Helical and Herringbone Gears is done in spacious Falk machine shops. Here are employed many special skills and special machines demanded by Falk's unusual quality standards.

Special gear cutting machines give absolute control over cutting accuracy. Delicate precision instruments in the Falk sound-proofed, air conditioned laboratory check cutting hobs for accuracy within .0001".

**THE FALK CORPORATION
MILWAUKEE 8 WISCONSIN**

For over fifty years precision manufacturers of Speed Reducers . . . Motoreducers . . . Flexible Couplings . . . Herringbone and Single Helical Gears . . . Heavy Gear Drives . . . Marine Turbine and Diesel Gear Drives and Clutches . . . Steel Castings . . . Contract Welding and Machine Work . . . District Offices, Representatives, or Distributors in principal cities.

FALK

. . . a good name in industry

made for mounting a blade which has heaters attached to it or it may be made to incorporate the heaters, thereby eliminating the necessity of attaching heaters to each blade. Temperature control may be automatic or manual, aided by a contact pyrometer.

Three methods of heating magnesium alloy sheets are used. The dies may be heated and the sheet preheated; the sheet may be heated by contact with the dies, or the sheet may be preheated and the dies used cold. The latter method may be used only where the operation is fast and forming is accomplished before the dies chill the sheet. In making long bends the tendency of heat to cause warpage is reduced when the dies are used at room temperature and the sheet heated. A slight pause is made after the bend allows the sheet to be chilled while it is held by the dies. Both contact plate and atmospheric type preheating ovens are used, the latter type being essential where more than one operation is required.

Large radius bends and variable radius bends are made in sheet rolls or by passing the sheet through an operating press brake in the conventional manner. Generally, the diameter of sheet rolls is larger than the minimum bend allowance for the sheet, so heat is not necessary. In some cases, however, the sheet is heated to reduce springback when the roll will not form a radius as small as desired. If heat is required on press brake contouring operations both dies and stock are heated.

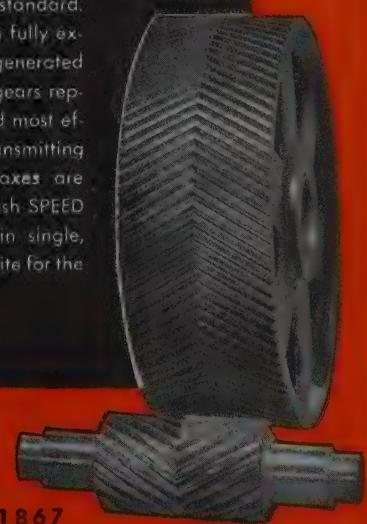
Bending Extrusions: Extrusions may be bent by hand methods, using a torch if heat is necessary and checking with a hand pyrometer. Production bending may be done on standard angle rolls, in mating dies, in stretch forming machines, or on other specialized industrial bending equipment. In the relatively few cases where heating is necessary the stock may be preheated in an oven. Dies may or may not require heating depending on the size of the section and the length of time consumed in the forming operation. Experimental work with both induction heating and heating by passing current through the extrusion indicates both methods are feasible in cases where high enough production is involved to warrant the expense of setting up for these methods.

Stretch Forming: Only a small amount of stretch forming has been reported with magnesium sheet but indications are that this method of forming is entirely possible. Work at room temperature has been limited to annealed sheet. At room temperature the operation is essentially the same as working aluminum; sharp, serrated grips should not be used. Both annealed sheet and hard rolled sheet may be stretch formed hot. Punch for such



FULL BENEFIT FROM A PRINCIPLE

The double helical principle has been exploited for years, but it was limited beyond an angle of 30°. The Sykes method of generating continuous tooth herringbone gears is not handicapped by limits on the maximum helix angle. But because the FULL BENEFIT OF THE HELIX PRINCIPLE is obtained with the 30° helix angle, this angle has been chosen as standard. Because this principle has been fully exploited, the OTTUMWA-Sykes generated continuous tooth herringbone gears represent the most economical and most efficient method yet devised for transmitting power between shafts whose axes are parallel. OTTUMWA can furnish SPEED REDUCERS and INCREASERS in single, double and triple reduction. Write for the instructive OTTUMWA catalog.



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OTTUMWA IRON WORKS

ENGINEERS • FOUNDERS • MACHINISTS

OTTUMWA, IOWA, U. S. A.

operations is made in the same manner as punches for draw dies.

Drop hammer type forming generally is not recommended for magnesium alloys unless the part is relatively simple and can be made in one operation. Principal difficulty experienced when many blows of the hammer are required is keeping the sheet heated since a partially formed sheet has only a small portion in contact with the lower die surface.

Spinning is a useful method for working magnesium alloys in making limited quantities of parts or for accomplishing certain type operations which would be difficult or impossible by other means. Heat for spinning may be applied by means of a hand torch, a heated chuck may also be used, and the sheet heated by conduction. When a torch is used for heating, maple chucks are satisfactory. A metal chuck is used where large numbers of parts are required or where the chuck is to be heated. Standard spinning tools with brown laundry soap for lubrication have been used with good success in hot-spinning operations.

Forging: The greater percentage of magnesium forgings in use are made on presses in contrast to hammers¹⁸. This can be attributed to the fact that the stronger alloys which are amenable to slow press action become hot short under rapid blows of the hammer. Hydraulic presses have an important role in the forging of magnesium in view of their flexibility such as variable rate of pressing, ease of control of stroke and control of dwell at bottom of stroke. Pressing speeds up to 50 in. per min have been used on magnesium. Ability of the press to dwell for 1 min at top the pressure often will help make a forging that could not otherwise be produced. Table XXIV, gives typical compositions of forging alloys.

Details of magnesium forging die design are quite similar to good aluminum design practice. Dies for press working of magnesium are generally made of chromium-tungsten-vanadium hot working steels. Cast steel dies and, at times, even alloy cast iron dies have been used on hydraulic presses. Dies for intermediate forging operations can be made of cast steel. This type of die, however, is not recommended for hammers or mechanical presses.

Forging stock is heated to 550 to 775°F depending on forging die design, alloy, and number of reheat necessary. Since sizeable proportion of magnesium forgings is used in the as-forged condition, final properties are strongly influenced by temperature and reduction on the finish forging operation. The lower the temperature the higher the properties. A temperature of 550°F is quite low and would result in cracking on many jobs. Forgings can be cold coined to a limited degree in hot dies with consequent improvement in strength properties.

Upper limit of the forging temperature range is dependent upon hot short characteristics of the particular alloy being forged as well as the presence or absence of excessive tensile forces exerted during the forging operation. In order to keep grain size to a minimum on forgings involving several reheat, it is advisable to drop the temperature on each successive operation. Roughly, the temperature between heats should be dropped 50°F for deformations over 50 per cent reduction in area, and about 75° for those with lesser reductions.

General practice on magnesium press

forging is to heat the dies. Dies can be conveniently heated by means of ring gas burners equipped with blast tips. Best results are obtained with automatic tem-

Previous Articles In Current Magnesium Alloy Series

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perature control of the dies which are maintained at temperatures of 500 to 700°F. Die life is not adversely affected by the operating temperature. Heating of the dies is necessary because of the low specific gravity of magnesium alloys. Their mass is low and so available heat is rapidly transferred to an insufficiently heated die. Use of a strong high temperature insulation material between dies and press can be made to prevent spreading of the heat to the press. The insulation, however, is successful only when the forging die is loaded uniformly.

Thin flash (0.050-in. and less) can be cold sheared but heavier flash needs to be either hot sheared or removed on the band saw. Heavy flash when sheared cold leaves a fractured edge.

A graphite base lubricant is satisfactory for magnesium forgings. The lubricant can be swabbed or sprayed on the hot dies. The amount of lubricant applied needs to be varied with the particular job on hand because over-lubrication can cause as much trouble as under-lubrication.

Generally, extruded bar stock is used for forging. The extruded stock is sound and fine grained and as a rule can be more readily forged than cast blanks. Forging blanks of odd cross sectional shapes often can be cut from specially designed extrusions. In contrast to cast blanks, an extruded blank will acquire maximum properties with lesser forging reductions.

It is expected that in the future magnesium forgings will find an expanding market, particularly in aircraft, because of simplicity of design, their high strength-weight ratio, their high rigidity-weight ratio and their excellent machinability.

(Continued in later issue)

REFERENCE
16 Light Metal Age, Oct., 1944

WORKS
207½ AND MERRIMAN STS
SOUTH SIDE



The Levinson Steel Company

ESTABLISHED 1917

STRUCTURAL STEEL
PLAIN AND FABRICATED

Pittsburgh, Pa.

MAIN OFFICE
39 PRIDE STREET

To our
many friends:

Quite often I find myself reminiscing on the influences that have led to our present position in the steel industry. I shall never forget a few words of advice my father passed on to me during his late years. In essence, he spoke thus: "For twenty years I have worked hard in the metal business. I haven't much to show, except a little yard and a lot of friends. Always remember, my son, a few friends a little infinitely more valuable than a lot of money. Build your business on a solid foundation; develop a good reputation; be fair, square and reliable and your business will prosper."

Passed it on to my son, and he followed this advice and have passed it on to my wife, who has always followed this advice and have really meant it. Our motto in those days was, "We aim to please, we seldom miss," and that as the years went by we obtained an enviable reputation and promptly so

That was the foundation on which was built The Levinson Steel Company. As structural steel fabricators, and in late years as fabricators of steel for industrial furnaces, conveyors, and other special equipment, we have been commended repeatedly for our excellent workmanship and fine service.

Likewise, as warehousemen of steel products, our reputation for service and dependability has become nation-wide. We are proud to point out that despite periods of confusion and price irregularities, we have never charged a premium for any material from our warehouse stock.

In the last few years, when the hazards of material scarcity and shortage of time confronted all of us, there were occasions when our constructive co-operation proved instrumental in eliminating serious work stoppages and prevented break-downs. So successfully have we been a part of the work stoppage all-out war production, both old and new, from coast to coast, that competitors and customers alike have congratulated us for outstanding performance.

In the years to come, we pledge never to deviate from the policy that has brought to us so many good friends. We will continue, as in the past, to be fair, square and reliable.

Cordially,

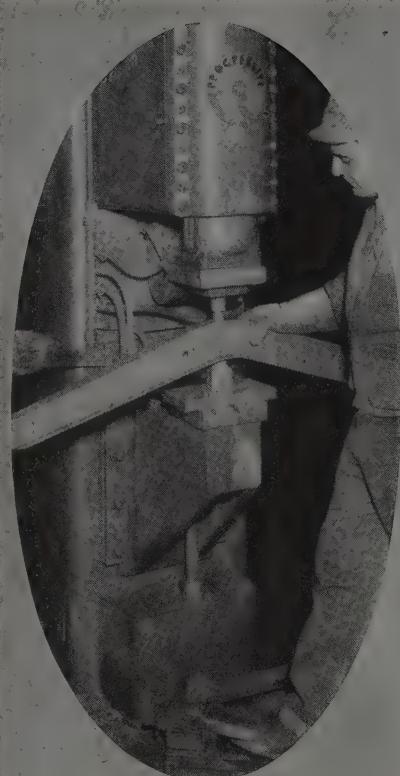
THE LEVINSON STEEL COMPANY

S.M. Levinson



LS-A

*This letter appeared as an advertisement in 1941



How to Attach a threaded nut

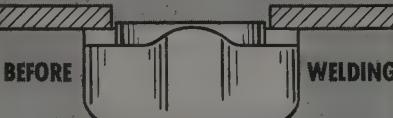
The simplest and best way to attach a nut is to **THREAD IT FIRST** and then projection weld it to the part. That's what Midland Steel Products is doing on automobile and truck frames—using a **Progressive Press Welder**. **NO RETAPPING** is necessary after welding.

Formerly either arc-welded or mechanically attached to frames, these nuts (see sketch) are placed in a die on the lower platen of the welder. The part is slid along until a registering hole drops over the shoulder on the nut. The upper platen is brought down, one shot of current is passed through the nut, fusing the projections to the side-rail and the job is finished. A dozen or more nuts are attached to the side-rail shown in this manner. Nuts range in size from $\frac{1}{4}$ to $\frac{1}{2}$ inch.

If you have a problem of attaching threaded studs or nuts to other parts, consult Progressive's **PROCESS ENGINEERING DEPARTMENT**. We will be glad to help you.

Are you reading Progressive's Resistance Welding Pictorial? Here you will find each month case histories of how **WELDINGENUITY** is cutting manufacturing costs and improving product appearance, performance and life. Ask for it on your company letterhead.

THE PART



IT PAYS TO WELD

PROGRESSIVE

CABLE ADDRESS "PROGWELD"

Welder Co.

3050 E. OUTER DRIVE • DETROIT 12
RESISTANCE WELDING EQUIPMENT

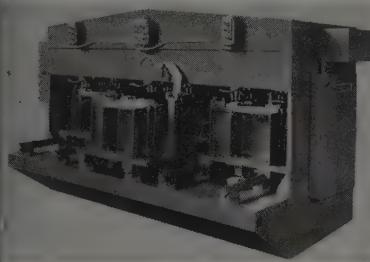


New Products and Equipment

1. Multi-Transformer Welder

In the multi-transformer welder, manufactured by Progressive Welder Co., 3050 East Outer drive, Detroit, small individual transformers are used for each weld or pair of welds. Advantages of this arrangement are that greater variation can be incorporated if desired in the weld characteristics, and that machine may be easily reworked in case of model or design changes.

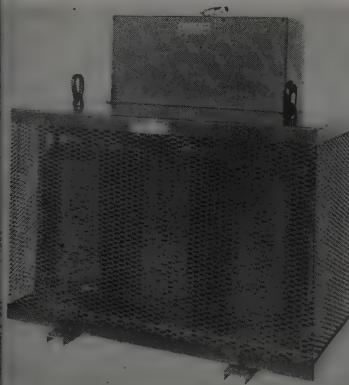
Machine illustrated has three separate units, performing identical operations. Each unit has six 14 kva transformers,



each taking care of two welds in series. Depending on power available, all guns in one unit can weld simultaneously, or half can weld simultaneously, followed immediately by the other half, or guns can weld in pairs, one after the other. Machine holds parts in position automatically and feeds them in welding position. Each of three welding units is independent of the other two.

2. Air Cooled Transformers

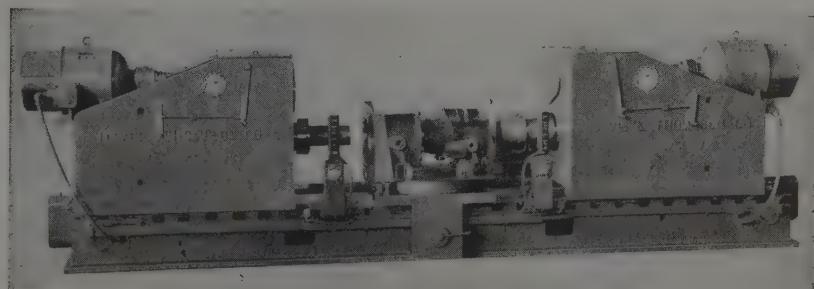
Developed for use with electric furnaces, a line of air cooled transformers manufactured by Lindberg Engineering Co., 2444 West Hubbard street, Chi-



ago 12, is used to test functions and applications requiring heavy current.

Transformers feature a built-in wiring compartment and terminal board to facilitate installation. Tap switches to handle up to 500 amp are available for all trans-

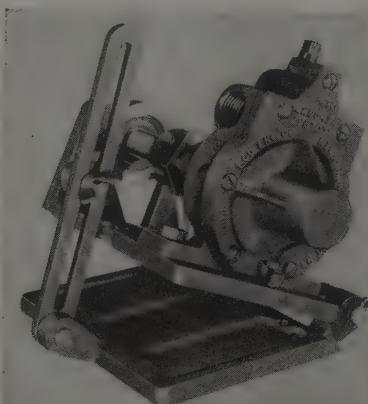
Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 152



formers. Models are rated from 1 to 100 kva, up to 600 v, single, three, or three to two phase. Illustrated is a 50 kva transformer.

3. Tilting Pump Base

Tilting pump base, suitable where it is necessary to engage and disengage the pump, is introduced by Eco Engineering Co., 82 New York avenue, Newark 1, N. J. Made entirely of bronze, it incorp-



rates a double-sealed, grease-packed outboard shaft bearing which retains its lubricant indefinitely. Tightening of belt slack is provided by the tilting base, which will hold the pump at any angle up to 45 degrees by means of a wing nut. Base will fit all 1/2 and 1 in. single and double impeller Eco gearless pumps.

4. Boring Machine

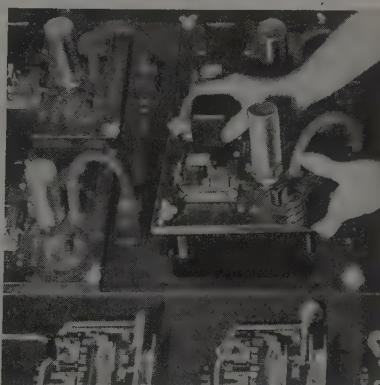
The 2WI boring machine, made by Davis & Thompson Co., Milwaukee 14, makes possible boring of large holes to accurate dimensions at a high rate of production. Machine illustrated bores a 14 $\frac{1}{4}$ -in. diameter hole 12 in. deep from one side and a 9 in. diameter hole 12 in. deep

from the opposite side at the rate of two parts or eight bores per hour. It has an indexing table on which fixture is mounted.

Cycle of operations provides for rapid traverse to the work. Telescoping gage is used to predetermine length of bore. An individual drive is provided for each head, consisting of a 15 hp variable speed direct current motor, a set of V-belts, a set of change gears and a gear train. Speed range of 330 to 1000 rpm is obtained by varying motor speed. Disengaging clutch drives machine through change gears and gear train to spindle at 60 to 300 rpm.

5. Electronic Control Unit

Usefulness of electronics for applications in rubber and steel mills is expanded by the quick-change electronic control unit panel manufactured by Cut-



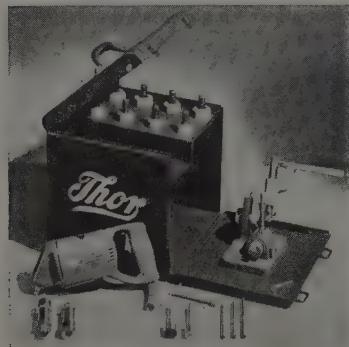
ler-Hammer Inc., 320 North 12th street, Milwaukee 1.

Designed for rapid and easy servicing, its captive wing nut mounting and multiple contact plug arrangement permits instant substitution of a "spare" panel at any time, providing virtually uninterrupted machine operation whenever em-

ergencies require removal of the electronic unit for testing or service bench attention. Simplicity of design and better spacing of components on the panel reduces maintenance costs.

6. Valve Seat Grinder

Driven by an exceptionally powerful universal electric motor, the Thor valve seat grinder, manufactured by Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago 6, has a cushion



ioned design feature to provide automatic precision with a minimum of operator control. Introduced with the grinder is a complete kit of accessories, including wheel dresser, pilots, wheels, etc., packed in a metal carrying case.

7. Dust Control Unit

Handling with equal ease large chip and shaving problems encountered in some industries and light pulverized float dust encountered in others, the dust control unit made by Tubulector Co., 2131 North Spaulding, Chicago, is capable of exerting and maintaining a constant rate of suction. By employing a tubu-



lar filter arrangement, the unit utilizes the maximum amount of filter surface area, handling only from 10 to 22 cu ft of air per square foot of filter surface area.

Use of unit conserves heated air by recirculating filtered air instead of exhausting outdoors. Filter tubes are thoroughly fireproofed. The unit can be furnished with a hopper bottom holding up to 65 gal of dust. Only an occasional shaking is required to keep the unit at peak efficiency. It is made in three models with 280, 480 and 1050 cfm capacity.

8. Photographic Reproducer

Anything drawn, typed, printed or photographed on translucent material may be reproduced as a positive copy with the positive printing, dry developing machine, the Streamliner, offered by Ozalid Divi-



sion of General Aniline & Film Corp., Johnson City, N. Y. Completely dry prints are ready for use after two operations. Only 25 sec are required to reproduce standard size engineering drawings.

Originals can be of any length and up to 42 in. wide. Lines and images of originals can be reproduced in black, blue, red, sepia or yellow, on paper, cloth, foil, film or plastic. The machine also produces oil and water proof prints, for shop or field use, or true color copies of 5-color transparencies.

9. Pyrometric Control

With an electronic control mechanism offering chatter-free relay operation unaffected by line voltage variation, surge effects, tube aging or component changes, the Veritron electronic pyrometric controller announced by Taco West Corp., 2620 South Park avenue, Chicago, is suited for installation on industrial furnaces and plastic molding machines. In operation, control pointer is set at desired temperature and control is immediately established within an exceptionally narrow temperature range.

Electronic circuit requires no turning

or other adjustments at any time, a pointer movement upon scale of 0.002 in. produces exacting relay operation. Measuring system and electronic mechanism are separately housed in sealed units that plug into the instrument cas-

10. Torque Measuring Device

Airdraulics Engineering Inc., New Canaan, Conn., announces a model SDF-25 beam scale torque measuring devic



for checking accuracy of torque screw drivers and wrenches, and to test and adjust power tools. It also enables manufacturing plants to set up torque standards and specifications on all fastenings.

Scale is accurate to a fraction of a inch pound with a standard capacity up to 25 in.-lb; this may be made to vary by increasing or decreasing the regulating weight. Unit is chromium plated, light in weight and demountable. Adapters are made to suit special applications. Scales of larger capacity also are made.

11. Radial Ball Bearings

Medium loads and maximum speed in neighborhood of 2500 to 3000 rpm are recommended for the series 300 unground radial bearings announced by Nice Ball Bearing Co., Philadelphia. Bearings incorporate one-piece inner and outer races turned from high quality steel, heat treated to a uniform degree of hardness. A ball retainer, or separator

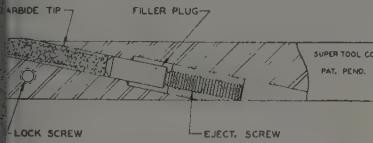


of the 2-piece type, reduces ball contact friction and increases range of allowable speeds.

Although designed primarily for radial beds, the depth of groove in ball tracks provides considerable thrust capacity. All bearings are finish ground to a tolerance of 0.0006-in. on the outside diameter, and are held to a tolerance of 0.005-in. or less on the inside diameter.

12. Ejector Type Carbide Tool

An ejector type tool which provides for secure holding of the solid, replaceable carbide bit without applying stresses, is announced by Super Tool Co., 21650 Hoover road, Detroit. Made in various



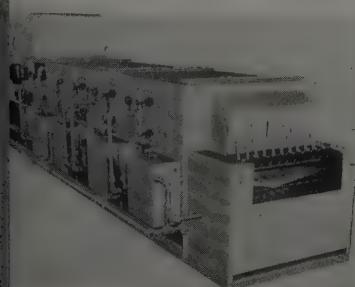
shapes and styles, it is resharpened by turning the recessed ejector screw to extend the carbide bit. With the bit thus extended, it is never necessary to grind or bring the diamond wheel in contact with the steel holder.

3. Hydraulic Cylinder

Hydraulic cylinders for service up to 500 psi are offered by Hannifin Corp., 101 South Kilbourne avenue, Chicago 4, in two large sizes, 7 and 8-in. bores, design and construction parallel company's smaller sizes, with bored and honed cylinder bodies; automotive type piston rings and interchangeable end caps. Nine mounting styles are available, with standard rod, large (2 to 1) rod double-end rod.

4. Metal Washing Machine

Cleaning and processing of metal parts prior to plating are handled by the flat conveyor type washing machine, design-



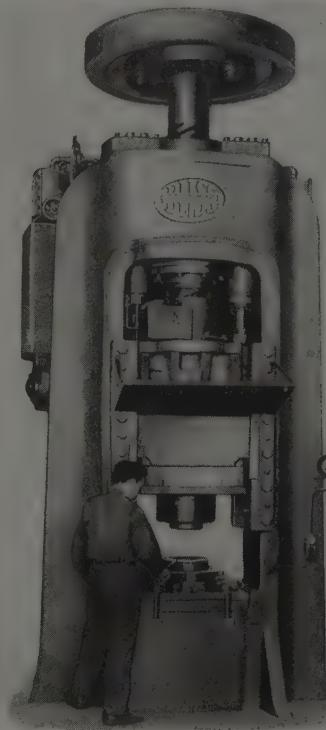
ed as No. WRDXHCF, manufactured by Optimus Equipment Co., 177 Church street, Matawan, N. J. It handles a sequence of related operations in seven consecutive stages: Hot alkali wash,

drain, hot water rinse, warm cyanide wash, cold rinse to sewer, hot rinse and dry.

Entire operation takes metal parts directly from processes, such as polishing, and feeds directly to the plating machine. Conveyor can be built with flight bars for baskets and individual pieces, or with a mesh belt. Overall size of machine is 35 ft long, 6 ft wide and 7 ft high. It is designed with a belt speed of 4 fpm, but can be adapted to a wide range of speeds and types of treatments.

15. Percussion Press

Hydraulic pressure for moving the slide and making possible rapid economical production of hot forgings, steel, brass, aluminum in a wide range of



shapes is incorporated in the percussion press developed by E. W. Bliss Co., Detroit 2. Operating principle of press employs a flywheel at top of screw which

FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 152.

is brought up to speed by hydraulic pressure. It utilizes the accumulated energy developed to deliver a hammer-like blow, uniform in power.

On a 16-in. stroke under maximum power, cycle of press is completed with-

in 3 sec, start to return. Power is adjustable and can be reduced by regulating delivery of variable delivery pumps. Quick-acting valves reverse motion of the hydraulic pistons for immediate reversal at rebound. Slide may be inched up and down in small increments to enable setting without danger of injuring dies.

Slide area is 25 x 27 in. and bed area is 26 x 29 in. Press has one 40-hp 1200 rpm motor and two pumps. Flywheel speed is 115 rpm and kinetic energy is 21,000 ft-lb. It is manufactured in 400, 600 and 1000-ton capacities.

16. Drill Press Conversion

An all angle radial arm to be mounted on standard 2, 2½, 2½ or 2¾-in. column drill presses, converting them into radial drilling machines, is offered by Empire Foundry & Machine Corp., Ashland, Ky.



The arm increases chuck to column capacity by 16 in. and auxiliary column increases chuck to base capacity 5 in.

Arm is clamped firmly to base collar by bolts through a table graduated through 90 degrees (45 degrees left, 45 degrees right). Base collar is equipped with clamp lock that releases or tightens two clamping wedges simultaneously. Standard drill press table or bed can also be mounted on radial arm.

17. Heat Exchanger

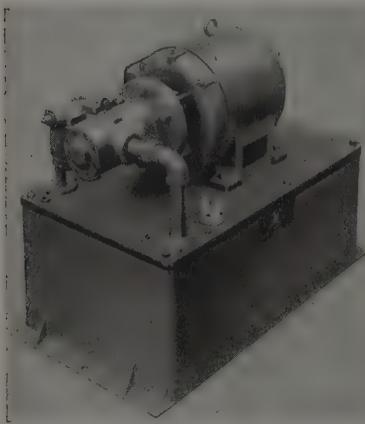
Corrosion-resisting heat exchanger for heating or cooling small quantities of corrosive solutions over a wide temperature range is announced by Duriron Co., Inc., Dayton 1, O. One unit, the No. 4 size, handles an acid flow of from 4 to 14 gpm with a heating capacity up to 155,000 Btu per hour with 75 lb steam pressure and inlet temperature between 70 and 180°F. Its cooling capacity is up to 90,000 Btu per hour, based upon 100°F mean temperature differential.

Units may be connected in series or

parallel. Features include: Separation of steam or coolant from the corrosive by a Duriron tube, vertical or horizontal installation, no packing against corrosive solution, removal of parts without disturbing steel or coolant inlet and outlet connections.

18. Hydraulic Power Units

Self contained hydraulic power units for hydraulic systems are currently produced in standard sizes of 20, 30 and 60 gal tank capacities by Vickers Inc., 1480 Oakman boulevard, Detroit 32. Three types of constant delivery vane type pumps are offered—single and two-



pressure for 1000 psi and 2-stage for 2000 psi continuous duty operating pressures.

Units combine oil reservoir, pump, suction filter, combination filler cap and air cleaner, oil level gage and other accessories for a complete power source. Power unit shown is equipped with 2-stage pump and relief valve. All intermediary piping between pump, oil reservoir, etc. is provided. Pumps are arranged to accommodate electric motors of various makes.

19. Straddle Truck

A new straddle truck, designated as model MH, is announced by Hyster Co., Portland 8, Ore. Its feature is a sloping hood which permits maximum driver visibility. A new type hoist mechanism further assures ease of operation of this 30,000-lb capacity machine.

20. Drop-Bottom Skid Box

To mechanize handling of metal shavings, scrap, small forgings and castings, a 4000-lb telescopic fork truck has been adapted for use with a drop-bottom skid dump box, by its manufacturer, Automatic Transportation Co., 149 West 87th street, Chicago 20. Box may be placed beneath drilling machines, lathes or other

equipment where loose materials are produced or accumulated.

When box is filled, it is picked up like an ordinary skid platform, by the fork



truck. The load is raised and steel loops at upper rear corners of box hook over pegs at top of truck's uprights. When forks are lowered, the hinged bottom of dump box automatically opens.

21. Overhead Traveling Crane

Design refinements in traveling overhead cranes built by Shaw-Box Crane & Hoist Division of Manning, Maxwell & Moore Inc., Muskegon, Mich., are func-



tional as well as appearance improving. Liberal use of color on working parts is a safety feature. Interior of operator's cage is painted buff for eye ease, while side panels and top of cage are light gray.

Outside of idle girder, walkway along driving girder and back and sides of operator's cage are sheathed with corrugated aluminum. Sheathing along platform serves to keep dropped objects from falling to the floor. New cage design also gives operator greater visibility.

Modernized crane shown is of 10-ton capacity with a span of 55 ft.

22. ELECTRONIC CONTROLLER

Dynalog electronic recording pyrometers with a continuous balancing action, features a recording pen that traverses the full width of the chart in 1 sec. Made by Foxboro Co., Foxboro, Mass., it has 1/10 of 1 per cent sensitivity and is offered for temperature measurement with ranges between minus 200 and plus 2800° F and for use with thermocouples or electric resistance bulbs.

23. PLASTIC CASTER WHEELS

Phenolic plastic caster wheels composed of macerated duck canvas and plastic, for use on gravity conveyors are announced by Rapids-Standard Co. Inc., Grand Rapids 2, Mich. They are resistant to oil, grease, mild acids and temperatures to 200° F.

24. RACK COATING

U. S. Stoneware Co., Akron, announces a rack insulator and protective coating that builds up to $\frac{1}{8}$ to $\frac{1}{4}$ -in. in a single dip. Known as Tygoflex rack coating, it may be applied by dipping, spraying or brushing, converting to a thick, impermeable insulator after being subjected to heat. It handles all plating acid or alkaline solutions at temperatures up to 250° F for an unlimited time.

25. POWDERED HAND SOAP

Sopec powdered hand soap and grease remover, developed by Speco Inc., 314½ Superior avenue, Cleveland 14, is suitable for use in washroom dispensers and reputedly combats industrial dermatitis. Nonabrasive and fast acting, it is offered in 6 oz handy containers, 5 lb fiber pack ages and 170 lb fiber drums.

26. RACEWAY COUPLING PLATE

Adjoining lengths of Surfaceduct wiring raceway may be bolted together with the new 2 x 5½-in. steel coupling plate made available by National Electric Products Corp., Chamber of Commerce building, Pittsburgh. Designated as No. 1744-X, it slips into the lower beading of the 1½ x 2½-in. raceway. Two bolt through each duct length and the coupling plate provide reinforcement and effect grounding.

FOR MORE INFORMATION

on the new products and equipment in this section, fill in this card. It will receive prompt attention.

Helpful Literature

38. Welding Fume Collectors

Ruemelin Mfg. Co.—4-page illustrated bulletin No. 37-C discusses operation of fume collectors which draw smoke and heat away from arc welding operations by use of high velocity exhaust tools, with fan exhausting outdoors.

39. Power Driven Conveyor

Rapids-Standard Co.—4-page illustrated folder form No. PV-N-46 contains information on design and uses of improved Press-Veyor portable power-driven endless belt conveyor intended primarily for use in press rooms but adaptable to many other uses.

40. Synthetic Cutting Oil

Machinery Lubricants, Inc.—6-page illustrated catalog "Startlingly Original" describes application of Silver-Chip synthetic nonpetroleum cutting oil. Material is diluted in water for use.

41. Crucible Furnaces

Hevi Duty Electric Co.—4-page illustrated bulletin No. HD-1246 describes multiple unit crucible furnaces of 1.1, 2.5 and 6.0-kilowatt input sizes. Uses, design, construction and specifications are discussed.

42. Protective Coating

Rust-Oleum Corp.—4-page illustrated folder on R-9 journal protective coating describes how compound provides quick, effective and lasting protection against rust to journals, castings, driving rods, machined surfaces and finished parts.

53. Power Tools

Aristo Power Tools, Inc.—32-page illustrated catalog No. 1 describes line of AristoCraft power tools including drills; bench drill stands; jigger saws; bench grinders, buffers and polishers; 8 and 20-ton power presses; shaft equipment; 27-ounce air gun for smoothing, scaling, peening and riveting; power blowers; and suction cleaners.

54. Airless Blast Cleaning

Pangborn Corp.—20-page illustrated bulletin No. 214 describes operation, gives examples of efficiency, suggests versatility and points out advantages of Rotoblast airless blast cleaning method and equipment. Abrasive is fed to rapidly rotating vaned wheel from which it is thrown by intense centrifugal force at surface to be treated.

55. Chemical Pump

Oliver United Filters Inc.—6-page illustrated bulletin No. 308-R shows construction details and standard models of Olivite pump which is highly resistant to nearly all acids, caustics and other corrosive solutions, either hot or cold.

56. Rust Preventive

Rheem Research Products, Inc.—4-page illustrated folder on Iridite discusses use, properties and applications of this chemical treatment for producing complex chromate type corrosion resistant film on zinc or cadmium surfaces. It can be used as final finish or as paint base.

57. Portable Induction Heater

Ohio Crankshaft Co.—4-page illustrated publication describes, gives power input, and lists installation requirements for TOCCO heat gun which is portable induction heating unit for soldering, hardening, brazing, annealing, melting and forging operations.

58. Electronic Inspection System

Arma Corp.—8-page illustrated folder entitled "New Automatic Electronic Inspection System for Every Industry" presents design and method of operation data on Limtron equipment for inspection of all types of industrial products. Actual set-ups are illustrated and described briefly.

59. Water Conditioning

Liquid Conditioning Corp.—8-page illustrated catalog "Liquon" gives concise information on method and equipment for treatment of water, purification of process liquids and recovery of valuable substances from waste liquids. Chart graphically shows results of treating a given water by six different water conditioning methods.

60. Automatic Drilling Machine

Robbins Engineering Co.—8-page illustrated No. 3 Drillmatic catalog describes standard automatic machine designed for special purpose drilling, reaming, tapping and boring operations. These operations can be performed individually or in multiple, vertically, horizontally or at any angle in between.

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61. Condensing Units

Jack & Heintz Precision Industries, Inc.—6-page illustrated folder No. SF-5000 presents information on four models of air cooled condenser units. Specifications and capacity data are given. Motor, compressor and condenser are described in detail.

62. Low Temperature Brazing

Handy & Harmon—20-page illustrated bulletin, form No. 12-A entitled "Low Temperature Brazing of Metals with Sil-Fos and Easy-Flo for Speed, Strength, Economy" covers applications, advantages and characteristics of these silver brazing alloys.

63. Impact Wrench

Ingersoll-Rand Co.—6-page illustrated bulletin, form No. 5011, describes two models of electric powered and air operated impact nut wrenches for assembly line work.

64. Mobile Industrial Crane

Hyster Co.—16-page illustrated form No. 1059B presents data and information about Karry Krane of 10,000-pound capacity for general industrial use. Gasoline engine powered, unit utilizes conventional automotive controls and has adjustable five-position boom.

65. V-Belts and Sheaves

B. F. Goodrich Co.—Two illustrated catalog sheets describe multi-V-belts and Magic Grip sheaves. No. 2170 describes various types of V-belts manufactured by company and No. 2175 outlines advantages of company's sheaves and includes table of pitch diameters and bushing sizes of sheaves carried in stock.

66. Metal Treatment

Parker Rust Proof Co.—44-page illustrated catalog "Bonderizing" contains information on Bonderizing process and its applications on steel, aluminum, zinc and die castings. It also presents data on Bonderite as aid in deep drawing of steel and aluminum. Treatment preserves fine finishes by anchoring paint and retarding corrosion.

67. Arc Welders

Hobart Brothers Co.—6-page illustrated folder No. 3828 describes briefly two models of gasoline engine driven arc welders. Features are outlined.

68. Vertical Spindle Grinders

Hanchett Mfg. Co.—10-page illustrated bulletin No. 847-J describes new and improved surface grinding procedures with vertical spindle grinders of reciprocating table type. Complete machine data are given.

69. Height Gage

Pratt & Whitney—4-page illustrated pamphlet "Electrolimit Height Gage" describes and presents specifications of Electrolimit precision instrument which is particularly adaptable for comparing or transferring gage block-established dimensions, checking runout and routine surface plate checking.

70. Die Casting Machine

Light Metal Machinery, Inc.—6-page folder "Fully Automatic Die Casting with the Work Horse" describes Work Horse casting machine which has capacity of 16 ounces and will operate at speeds of from 240 to 720 shots per hour.

71. Radio & Electronic Product

Allied Radio Corp.—164-page illustrated 1947 buyer's guide and general catalog contains complete information on more than 10,000 radio and electron items with special emphasis being placed on equipment for industrial maintenance research and production uses.

72. V-Belt Drives

Allis-Chalmers Mfg. Co.—12-page illustrated guide book No. 20B6051G designed for quick reference in selection of economical V-belt drives. Textron drives and Texsteel and Texdrive sheaves are described and complete specific and application data are given.

73. Soluble Cutting Oil

Gulf Oil Corp.—6-page illustrated folder entitled "The New Gulf Soluble Cutting Oil" lists advantages of this so or hard water miscible oil. Recommended dilutions are covered.

74. Portable Jet Pumps

Derbyshire Machine & Tool Co.—page illustrated bulletin No. 315 details manner in which line of portable jet pumps, utilizing water under pressure as pumping medium, is used in removal, transfer and mixing of liquids, sludge, process wastes and fluids containing substances injurious to conventional pump equipment.

75. Oil Purification Equipment

Hanom-Crane Corp. 64-page illustrated catalog presents information on complete line of oil purification equipment to handle all types of lubricating and industrial oils. Cross-sectional drawings, specifications and dimensional data are given.

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Wage Boost Dims Chances For Early Steel Price Cut

Determination of industry policy hinges on impact of increased wages and supply costs on earnings' position. Downward adjustments thought likely as competition rises later in year. Scrap continues to sink to lower levels

STEEL wage settlement appears to have definitely removed the possibility of any immediate reduction in base prices on steel products. The wage increase, which in the case of U. S. Steel subsidiaries, averages out to around 6 cents per hour, will advance steelmaking costs an average of \$3.25 per ton of finished steel based on 1946 production of 53,073,421 tons requiring 1,082,250,000 man-hours.

Increased worker efficiency and volume production may hold down the cost increment but indications are it will take some time before firm price policy can be charted based on performance. As a matter of fact, whether the steelmakers will be able to absorb the wage increase without raising prices remains to be seen, for not only are direct labor costs involved but impact of the wage increase on raw material and equipment costs will be substantial when the wage settlement spreads to suppliers.

Despite the blow to prospects for an immediate price reduction, however, trade observers continue to predict some easing in the price structure later in the year when demand comes more nearly into balance with supply. Expectations are easiness will first show up in the waiving of extra charges as competition for orders accelerates. Most sellers of major steel products are expected to open their books for third quarter business within the next two weeks. Indications are there will be less carrier tonnage at the end of second quarter, especially now that a general steel strike has been averted, with resulting consumer quotas may be a little larger next quarter

DISTRICT STEEL RATES

	Week Ended	April 26	Percentage of Ingot Capacity Engaged	1946	1945
			Change		
Pittsburgh	100	+ 1.5	59	90.5	
Chicago	96	None	71	98.5	
Eastern Pa.	90.5	None	79	90	
Youngstown	86	None	60	94	
Wheeling	93.5	None	86	92.5	
Cleveland	93	- 2	95	97	
Buffalo	88.5	None	88.5	90.5	
Birmingham	99	None	64	95	
New England	95	None	88	90	
Cincinnati	85	+ 3	79	94	
St. Louis	92	+ 4.5	54	80	
Detroit	92	None	90	86	
Estimated national rate	95.5	None	70	94	

Based on weekly steelmaking capacity of 1,762,381 net tons for 1946; 1,831,636 tons for 1945; 1,791,287 tons for 1944.

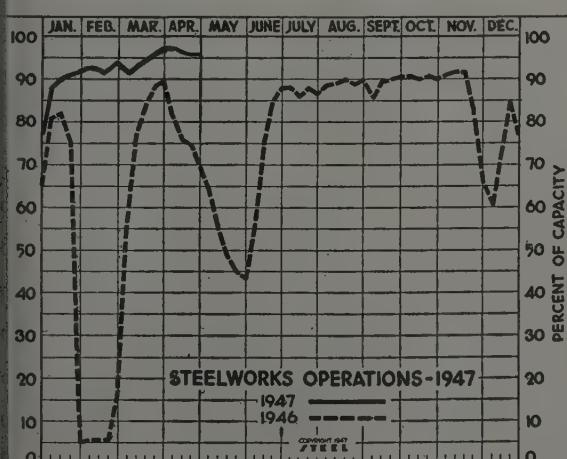
depending principally upon what develops with respect to coal mine labor trouble July 1 when the mines are returned to private ownership.

Scrap prices continue to sink, chiefly on steelmaking grades though an easier tone is noted also in foundry grades. Last week heavy melting steel fell another \$3 per ton at Pittsburgh with tonnage offerings at \$32 to \$32.50 going begging. Recent heavy movement of scrap has added materially to steelmakers' stocks, which, in some instances, now are reported in excess of 45 days' supply. Trading in remote material has come to a virtual standstill with some material shipped long distances being rejected as off-grade. Expectations are heavy melting will fall to \$30 per ton or lower at Pittsburgh before the market stabilizes.

Removal of the strike threat in basic steel assures high steel operations through June. Independent steelmakers are expected to follow U. S. Steel in arriving at terms with their workers. However, working out of settlements with steel fabricating companies which have contracts with the United Steelworkers may run into a snag with most of these firms insisting on settlements at the local plant level and with an eye to the competitive position of the individual company.

Steelmaking operations were up fractionally last week, the national ingot rate being estimated at 95.5 per cent of capacity, only 1½ points under the record peacetime high. The general trend of operations is upward and all districts with the exception of Youngstown have recovered from the adverse effects of the recent coal strike. Operations last week were 4½ points higher in St. Louis at 92 per cent, up 3 points at Cincinnati to 85 per cent, 1½ points higher at Pittsburgh to 100 per cent but off 2 points at Cleveland to 93 per cent.

Continued widespread weakness in scrap forced STEEL's composite price average on steelmaking grades to drop to \$31.33, off \$2.59 from the week preceding. Price composite on finished steel held unchanged at \$69.82, while that on semifinished steel was steady at \$52.10 and that on steelmaking pig iron unchanged at \$32.49.



COMPOSITE MARKET AVERAGES

	Apr. 26	Apr. 19	Apr. 12	One Month Ago Mar., 1947	Three Months Ago Jan., 1947	One Year Ago Apr., 1946	Five Years Ago Apr., 1942
Finished Steel	\$69.82	\$69.82	\$69.82	\$69.82	\$69.53	\$63.54	\$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	49.45	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.49	31.85	29.56	25.50	23.00
Steelmaking Scrap	31.83	33.92	34.92	36.67	31.17	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material	April 26, Mar., 1947	Jan., 1947	Apr., 1946	Pig Iron	April 26, Mar., 1947	Jan., 1947	Apr., 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.60c	2.50c	Bessemer, del. Pittsburgh	\$34.83	\$34.83
Steel bars, Philadelphia	2.95	2.98	2.98	2.82	Basic, Valley	33.00	33.00
Steel bars, Chicago	2.60	2.60	2.60	2.50	Basic, eastern del. Philadelphia	35.52	34.26
Shapes, Pittsburgh	2.50	2.50	2.462	2.35	No. 2 fdry., del. Pgh. N. & S. sides	34.33	34.33
Shapes, Philadelphia	2.64	2.64	2.602	2.465	No. 2 fdry., del. Philadelphia	36.02	34.76
Shapes, Chicago	2.50	2.50	2.462	2.35	No. 2 foundry, Chicago	33.00	32.50
Plates, Pittsburgh	2.65	2.65	2.612	2.50	Southern No. 2 Birmingham	29.88	29.28
Plates, Philadelphia	2.85	2.85	2.777	2.55	Southern No. 2, del. Cincinnati	34.75	34.15
Plates, Chicago	2.65	2.65	2.612	2.50	Malleable, Valley	33.50	33.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.425	Malleable, Chicago	33.50	32.90
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.275	Charcoal, low phos., fob Lyles, Tenn.	40.50	40.50
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	3.55	†4.05	Gray forge, del. McKees Rocks, Pa.	33.66	30.65
Sheets, hot-rolled, Gary	2.50	2.50	2.50	2.425	Ferromanganese, fob cars, Pittsburgh	140.25	140.00
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.275			
Sheets, No. 10 galv., Gary	3.55	3.55	3.55	†4.05			
Hot-rolled strip, Pittsburgh	2.50	2.50	2.50	2.35			
Cold-rolled strip, Pittsburgh	3.20	3.20	3.20	3.05			
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.425	3.05			
Wire nails, Pittsburgh	4.125	4.125	4.062	3.25			
Tin plate, per base box, Pittsburgh	\$5.75	\$5.75	\$5.75	*\$5.25			

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	\$50.00	\$50.00	\$47.00	\$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	41.25	39.00
Rerolling billets, Pittsburgh	42.00	42.00	41.25	39.00
Wire rods $\frac{1}{2}$ to $\frac{1}{4}$ -inch, Pitts.	2.55c	2.55c	2.55c	*\$2.30c

* Base, No. 5 to $\frac{1}{2}$ -in.

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, \$40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, Canton, \$52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, \$42; Portsmouth Steel Corp., \$55-\$60. Portsmouth, O. Detroit, del., \$45; eastern Mich., \$46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, \$50; Detroit, del., \$53; eastern Mich., \$54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, \$61; del. Detroit, \$64; eastern Mich., \$65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, \$50; Portsmouth Steel Corp., \$66, Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.35c per lb.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, $\frac{1}{2}$ to $\frac{1}{4}$ -in., inclusive \$2.55-\$2.80 per 100 lb. Galveston base, \$2.65. Worcester, add \$0.10. San Francisco (base, del.), \$3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c; San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Bar Steel Bars: Price, 2.60c-2.95c, same basing

points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c. (Texas Steel Co. uses Chicago base price as maximum for Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base, 20,000-39,999 lb, 3.20c; Detroit, 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60c-2.95c.

Iron Bars: Single refined, Pittsburgh, 6.15c-6.70c; double refined, 7.00c-8.50c; Pittsburgh, staybolt, 7.85c-10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c; Los Angeles (base, del.), 3.24c; San Francisco, (base, del.), 3.245c. (Andrews Steel Co., quotes Middletown, O., base for shipment to Detroit; Alan Wood Steel Co., Conshohocken, Pa., quotes

3.10c; Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c; Los Angeles (base, del.), 4.32c; San Francisco (base, del.), 4.32c.

Corrugated Galvanized Sheets, No. 10: Pittsburgh, Chicago, Gary, Birmingham, base, 3.55c.

Culvert Sheets, No. 16, corrugated: Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.15c; copper-iron or pure iron, 4.50c. Granite City base prices 10 points higher. Los Angeles (base, del.), 4.94c; San Francisco (base, del.), 4.94c.

Aluminized Sheets, No. 20 hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.20c; Kokomo, Ind., 4.80c. Armature: Pittsburgh, Chicago, Gary, 4.50c; Granite City, Ill., Kokomo, Ind., 4.60c. Electrical: Pittsburgh, Chicago, Gary, 5.00c; Granite City, Kokomo, 5.10c. Motor: Pittsburgh, Chicago, Gary, 5.75c; Granite City, 5.85c. Dynamo: Pittsburgh, 6.45; Granite City, 6.55c. Transformer: 72, 6.90c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c. (Superior Steel Corp., 3.30c, Pittsburgh.)
Sold-Rolled Strip: 0.25 carbon and less; Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del., 3.35c; eastern Mich., 40c; Worcester, base, 3.40c. (Superior Steel Corp., 4.70c, Pittsburgh.)
Gold-Finished Spring Steel: Pittsburgh, Cleveland, base: 0.26-0.40 carbon, 3.20c; over 0.40 to 60 carbon, 4.70c; over 60 to 80, 5.30c; dd 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, \$5.75; Granite City, Birmingham, Sparrows Point, \$5.85.
Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, \$4.85; 0.50 tin, \$5.05; 0.75 lb tin, \$5.25; Granite City, Birmingham, Sparrows Point, \$4.95, \$5.15, 5.35, respectively.

In Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 60c; Granite City, Birmingham, Sparrows Point, 3.70c.

Manufacturing Terne (Special Coated): Pittsburgh, Chicago, Gary, 100-base box, \$4.90; Granite City, Birmingham, Sparrows Point, \$5.00.

Coating Terne: Pittsburgh base per package 12 sheets; 20 x 28 in., coating I. C. 8-lb 3.50; 15-lb \$15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Tah, 2.80c; New York, del., 2.94c; Philadelphia, del., 3.85c; St. Louis, del., 2.47c; Boston, del., 2.86c; San Francisco and Los Angeles, del., 3.29c-4.6c.
Central Iron & Steel Co., Harrisburg, Pa., 85c, basing points; Alan Wood Steel Co., Enonhocken, Pa., 2.80c, Coatesville and Claymont equivalent.)

Door Plates: Pittsburgh, Chicago, 3.90c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 787c; Coatesville, 4.15c.

Lead Steel Plates: Coatesville, 10% cladding; nickel clad, 21.50c; Inconel-clad, 30.00c; monel, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; New York, del., 2.70c; Philadelphia, del., 2.64c; Geneva, Tah (base, del.), 2.675c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.4c; Kaiser, del., San Francisco, 3.41c.
Phoenix Iron Co., Phoenixville, Pa., nominally, 30c, Bethlehem, Pa., equivalent.)

Steel Piling: Pittsburgh, Chicago, Buffalo, \$3 per 100 lb.

Wire and Wire Products

Job Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads
 Bright, basic or bessemer \$3.30-\$3.55
 Bright (except Birmingham) **\$4.25

Wire Products to Trade
 Bars and Staples
 Standard and cement-coated \$3.75-\$4.50
 Galvanized \$3.75-\$4.50

Wire, Merchant Quality
 Annealed (6 to 8 base) \$3.95
 Galvanized (6 to 8 base) \$4.40

Job Pittsburgh, Chicago, Birmingham, per se column)

**Oven fence, 15 gage and heavier 1184
 Barbed wire, 80-rod spool 1194**

**Barless wire, twisted 94
 Wire posts (no clamps) 1190**

Wire ties, single loop 1186

Worcester, \$3.40, Duluth, \$3.35, base, San Francisco (base, del.) \$4.31 for bright only.

*** Worcester \$4.35, Duluth and Trenton, N. J., \$4.50, base, San Francisco (base, del.) \$6.63 for MB spring wire; \$5.28, black premier.**

Worcester \$4.05, Cleveland \$3.85, base, San Francisco (base, del.) \$4.83.

Duluth \$3.75, Cleveland \$3.85, base, San Francisco (base, del.) \$4.83.

Worcester \$4.05, annealed; \$4.50, galvanized.

Duluth \$3.95, annealed; \$4.40, galvanized.

San Francisco (base, del.) \$4.96, annealed; \$5.41, galvanized.

*** San Francisco (base, del.); Woven fence, barbed wire, 114; bale ties, 110. Duluth (base); Woven fence, 84; barbed wire, 94; fence ties, 90.**

Rails, Supplies

Rails: Standard, over 60-lb fob mill, \$2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, \$2.85 per 100 lb; light rails (steel), \$2.95, Williamsport, Pa.

Relaying: 60 lb and over, fob railroad and basing point, \$46-\$49 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, \$2.80 per 100 lb, fob mill; \$3.15 base, Seattle. Splice bars, \$3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about \$200 a net ton. Base discounts Pittsburgh on all types; Lorain in steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

		Butt Weld			
In.	Blk.	Gal.	In.	Blk.	Gal.
1/2	48	23	1/2	2	+20
1/4 & 3/8	51	30 1/2	1/2	-11 1/2	+10
1/2	55 1/2	41	1-1 1/4	-17	+2
3/4	58 1/2	45	1 1/2	22 1/2	-1 1/2
1-3	60 1/2	47 1/2	2	-23	-2

		Lap Weld			
In.	Blk.	Gal.	In.	Blk.	Gal.
2	53	39 1/2	1 1/4	-1	+20
2 1/2-3	56	42 1/2	1 1/2	-7	+13
3 1/2-6	58	44 1/2	2	-14 1/2	+5 1/2
8	58	42 1/2	2 1/2-3 1/2	-17	+1 1/2
10	57 1/2	42	4	-21	-4
12	56 1/2	41	4 1/2-8	-19	-2 1/2
			9-12	-10	+7

* Not T. & C.

		Seamless Steel			
In.	Blk.	Gal.	In.	Blk.	Gal.
2	52	38 1/2	*8	57	42
2 1/2-3	55	41 1/2	*10	56 1/2	42
3 1/2-6	57	43 1/2	*12	55 1/2	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about \$200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	1/2	47
2 1/2 & 3	54	1/4 & %	50
3 1/2 to 8	56	1/2	54 1/2
10	55 1/2	1	57 1/2
12	54 1/2	1 to 3	59 1/2

Boiler Tubes: Net base prices per 100 feet, fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D.	Hot	Cold	Elec.	Weld
B.W.G.	Roiled	Drawn	Hot	Cold
1"	13	\$10.89	\$10.62	\$10.62
1 1/4"	13	12.90	10.59	12.58
1 1/2"	13	12.00	14.26	11.70
1 3/4"	13	13.65	16.23	18.81
2"	13	15.29	18.17	15.00
2 1/4"	13	17.05	20.26	18.71
2 1/2"	12	18.75	22.31	18.38
2 3/4"	12	20.57	24.43	20.11
3"	12	21.80	25.89	21.27
3 1/2"	12	22.87	27.18	22.26
4"	11	26.88	31.94	26.15
4 1/2"	11	28.82	34.30	28.06
5"	10	35.82	42.55	34.78
5 1/2"	9	47.48	56.42	41.68
6"	9	54.96	65.30	53.30
7"	7	44.38	100.25	

Pipe, Cast Iron: Class B, 6-in. and over \$65 per net ton, Birmingham, \$70, Burlington, N. J.; \$75.56, del., Chicago; 4-in. pipe, \$5 higher, Class A pipe, \$3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

1/2-in. and smaller; up to 6 in. in length	55 off
1/2 & %, up to 6 in. in length	52 off
5/8 x 6 in.	49 off
5/8 and 1 in. x 6 in. length	51 off
1 1/2 in. and larger in all lengths and 1 1/2 in. and larger in lengths over 6 in.	48 off
1 1/2 in. and smaller, longer than 6 in.	45 off
Tire bolts	38 1/2 off
Step bolts	46 off
Plow bolts	57 off

Stove Bolts

In packages, nuts separate, 60-10 off; bulk 74 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

	A.S. Reg. and Heavy
1/2-in. and smaller	51 off
5/8-in. and smaller	48 off
5/8-in.-1 in.	48 off
5/8-in.-1 in.	47 off
1 1/2-in.-1 1/2 in.	46 off
1 1/2-in. and larger	44 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in., smaller (10-20 bright)	56 off
Upset (10-35 heat treated)	51 off
5/8 x 6	51 off
%, %, & 1 x 6	47 off

Square Head Set Screws

Upset 1-in. and smaller	61 off
Headless, 1/4-in. and larger	46 off
No. 10 and smaller	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago, Birmingham

Structural	5.25c
Lebanon, Pa.	5.40c
5/8-in. and under	55-5 off plus 15c per cwt.
Lebanon, Pa.	55-5 off plus 15c per cwt.

Washers, Wrought

Tool Steel	Base, per lb
Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.	
W	Base, per lb
18.00	74.00c
1.5	59.00c
12	62.00c
6.40	63.00c
5.50	80.00c

Stainless Steels

Base, Cents per lb

Bars, Drawn Wire, Structural	Hot Rolled Strip	Cold Rolled Strip
Grade	Plate Sheets	
301	26.00c	29.50c
302	26.00	29.50
303	28.50	31.50
304	27.50	31.50
308	31.50	37.00
309	39.00	43.50
310	53.50	56.50
316	43.50	48.00
321	31.50	37.00
347	36.00	41.50
431	21.00	24.00
440A	26.00	31.00

STRAIGHT CHROMIUM STEEL

403	23.50	27.00	32.00	28.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	38.00	39.50	38.00	56.50
*501	9.00	13.00	17.50	13.00	18.50
*502	10.00	14.50	18.50	14.50	19.50

***STAINLESS CLAD STEEL (20%)**

304	24.00	22.00	</
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RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

Pig Iron

Prices per gross ton

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	\$34.50	\$34.00	\$35.50	\$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50			38.00
Birdsboro, Pa., base	34.50	34.00	35.50	35.00
Philadelphia, del.	36.02	35.52	37.02	36.52
Birmingham, base	29.88	29.38	34.50	...
Baltimore, del.	36.28			...
Chicago, del.	34.12			...
Cincinnati, del.	34.75	34.25	...	...
Newark, N. J., del.	35.96			...
Philadelphia, del.	35.13			...
St. Louis, del.	33.87	33.37	...	...
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83			37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa., base	33.00	32.50	34.00	33.50
Everett, Mass., base	29.50	29.00	30.50	30.00
Boston, del.	30.00	29.50	31.00	30.50
Granite City, Ill., base	33.50	33.00	...	33.50
St. Louis, del.	34.25	33.75	...	34.25
†Neville Island, Pa., base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. Sides	34.33	33.83	34.83	34.33
Prov. Utah, base	33.50	33.00	...	...
Seattle, Tacoma, Wash., del.	38.60			...
Portland, Oreg., del.	38.60			...
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steeltown, Pa., base	34.50	34.00	35.50	35.00
Swedenland, Pa., base	35.50		36.50	36.00
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	...	...
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O., del.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66¢ for McKees Rocks, Pa.; \$1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97¢ (water), Monongahela; \$1.33, Oakmont, Verona; \$1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

High Silicon Silvery

Gray Forge

6.00-7.50 per cent (base)	\$40.50	Neville Island, Pa.	\$33.00
6.51-7.00	\$41.50	9.01-9.50	46.50
7.01-7.50	42.50	9.51-10.00	47.50
7.51-8.00	43.50	10.01-10.50	48.50
8.01-8.50	44.50	10.51-11.00	49.50
8.51-9.00	45.50	11.01-11.50	50.50
Fob Jackson, O., per gross ton; Buffalo base \$1.25 higher. Buyer may use whichever base is more favorable.			

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus \$1 per gross ton.

Electric Furnace Ferrosilicon: \$14.01-14.50%, \$52.75, Jackson, O.; \$56 Keokuk, Iowa. Add \$1 a ton for each additional 0.5% Si to 18%; 50¢ for each 0.5% Mn over 1%; \$1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn. . . . \$40.50 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, \$2 a ton; for each additional 0.25% nickel, \$1 a ton.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngs- town	Spar- rows Point	Can- ton	Buffalo	Bethle- hem	Can- ton	Massillon
Sheets, Hot-Rolled . . .	3.75-3.85	3.75-3.85	3.75-3.85	3.85	3.85	3.75-3.85	...	...	...	...
Cold-Rolled . . .	4.55-4.75	4.55-4.75	4.55-4.75	4.75	...	4.55-4.75	...	...	...	...
Galvanized . . .	5.40									
Strip, Hot-Rolled . . .	3.75-3.85	3.75-3.85	3.75-3.85	3.85	3.85	...	...	...	...	...
Cold-Rolled . . .	4.55	4.65	4.65	4.65	4.65	...	...	...	...	...
Shapes, Structural . . .	3.85	3.85	...	3.85	3.85	...	...	3.85	...	...
Plates . . .	4.10	4.10	4.10	4.10	4.10	...	...	3.85	...	...
Bars and Bar Shapes . . .	4.00	4.00	4.00	4.00	4.00	...	4.00	4.00	4.00	4.00

Note: Lower level of quoted ranges represent prices for NAX High Tensile, produced by Great Lakes Steel Corp., Detroit.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace . . .	*\$8.75-\$9.50
Connellsville, foundry . . .	9.75-11.00
New River, foundry . . .	12.50
Wise county, foundry . . .	11.15
Wise county, furnace . . .	10.65

* Operators of hand-drawn ovens using trucked coal, \$9.35-\$10.10.

By-Product Foundry

Kearney, N. J., ovens . . .	\$15.35
Chicago, outside del. . . .	15.10
Chicago, del. . . .	16.10
Terre Haute, del. . . .	15.60
Milwaukee, ovens	15.85
New England, del. . . .	17.25
Birmingham, del. . . .	12.35
Indianapolis, ovens . . .	14.50
Cincinnati, del. . . .	15.35
Ironon, O., ovens	13.35
Painesville, ovens	14.60
Cleveland, del. . . .	15.90
Buffalo, del. . . .	16.10
Detroit, del. . . .	15.75
Philadelphia, ovens . . .	14.50
Portsmouth, O., ovens . .	14.00
Fairmount, W. Va., ovens . .	13.75
Pittsburgh, del. . . .	15.61

Old range bessemer . . .	\$5.90
Old range nonbessemer . .	5.8
Mesabi bessemer . . .	5.7
Mesabi nonbessemer . .	5.5
High phosphorus . . .	5.5

Malleable Bung Brick

All bases 80.00

Silica Brick

Pennsylvania 70.0

Joliet, E. Chicago 79.0

Birmingham, Ala. 70.0

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk 24.0

Single bags 28.0

Ores

Lake Superior Iron Ore

Gross ton, 51 1/2% (Natural)

Lower Lake Ports

Cents, units, del. E. Pa.

Founds and basic 56-63% contract 15.2

Eastern Local Ore

Cents, units, del. E. Pa.

Founds and basic 56-63% contract 15.2

Foreign Ore

Cents per unit, cif Atlantic ports

N. African low phos. Nom

Swedish basic, 60 to 68% 13.0

Spanish, No. African basic Nom

Sic. 50 to 60% Nom

Brazil iron ore, 68-69% fob Rio de Janeiro 7.50-8.00

Tungsten Ore

Wolframite, per short ton unit, duty paid \$24-\$28

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Charles

ton, S. C., Portland, Oreg., or Tacoma, Wash.

(S \$ paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charles

ton, S. C., Portland, Oreg., or Tacoma, Wash.

(S \$ paying for discharge; dry basis, subject to penalties if guarantees are not met.)

South African (Transvaal) 44% no ratio \$27-\$27.50

45% no ratio 28.0

48% no ratio 30.0

48% 3:1 31.0

48% no ratio 31.0

Low Heat Duty

South African (Transvaal) 44% no ratio \$27-\$27.50

45% no ratio 28.0

48% no ratio 30.0

50% no ratio 31.0

Intermediate Heat Duty

Ohio 64.00

Pa., Ill., Md., Mo., Ky. 64.00

Ala., Ga. 56.00

N. J. 67.00

Indian and African 48% 2.5:1 lump \$33.6

48% 3:1 lump 43.5

Rhodesian 45% no ratio \$27-27.5

48% no ratio 30.0

48% 3:1 lump 39.0

Domestic (seller's nearest rail) 48% 3:1 \$39.0

Molybdenum

Sulphide conc., lb., Mo. cont., mines \$0.70

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads

effective CaF₂ content, 70% or more

\$33; 65% to 70%, \$32; 60% to 65%

\$31; less than 60%, \$30.

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP			BARS			H-R Alloy			PLATES		
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	H-R	C-R	H-R	C-F	(\\$4140)	Structural Shapes	Carbon % ^a / _b	Floor % ^a / _b	Thicker			
Boston (city)	4.50	.....	5.22 ^a	5.55 ^a	6.80 ^a	4.65	6.36	4.62	5.22	7.12	4.47	4.70	6.42			
New York (city)	4.42	.....	5.27 ^a	5.47 ^a	.....	4.62	.....	4.62	5.17	8.42 ¹²	4.37	4.72	6.35			
New York (country)	4.32	.....	5.17 ^a	5.37 ^a	.....	4.52	.....	4.52	.....	.....	4.27	.....	6.25			
Philadelphia (city)	4.24	5.73 ^a	5.33 ^a	5.29 ^a	6.54 ^a	4.43	5.28	4.48	5.38	6.87	4.22	4.44	5.93				
Philadelphia (country)	4.14	5.63 ^a	5.23 ^a	5.19 ^a	6.44 ^a	4.33	5.18	4.38	.....	6.80	4.12	4.34	5.83			
Baltimore (city)	4.09	6.15 ^a	5.65 ^a	5.14 ^a	6.39 ^a	4.40	.....	4.45	5.85	.....	4.34	4.39	5.90			
Baltimore (country)	3.59	6.05 ^a	5.55 ^a	.....	.....	.....	.....	.....	4.85	.....	4.24	4.29	5.80			
Washington (city)	4.35	.....	.....	5.18 ^a	6.43 ^a	4.65	.....	4.70	5.60 ¹¹	.....	4.60	4.65	6.60			
Norfolk, Va.	4.35	.....	.....	.....	.....	.....	.....	4.75	5.50	.....	4.50	4.50	6.25			
Buffalo (city)	4.05	.....	4.75 ^a	5.35 ^a	.....	4.30	5.25	4.10	4.75	.....	4.10	4.65	5.90			
Buffalo (country)	3.90	.....	4.80 ^a	4.95 ^a	.....	3.90	4.85	3.95	4.60	6.60	3.95	4.20	5.45			
Pittsburgh (city)	4.05	5.20 ^a	4.75 ^a	5.10 ^a	6.35 ^a	4.05	5.00	4.10	4.75	6.60	4.10	4.30	5.60				
Pittsburgh (country)	3.90	5.05 ^a	4.60 ^a	4.95 ^a	6.20 ^a	3.90	4.85	3.95	4.60	6.60	3.95	4.15	5.45				
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.80	4.00	.....	4.238	5.138	.....	4.218	4.488	5.178			
Youngstown, O. (country) . . . . .	.....	.....	.....	4.95	6.20	3.90	.....	.....	.....	.....	.....	.....	.....
Detroit	4.15	5.30	4.85	5.42	6.67	4.34	5.24	4.20	4.87 ¹²	7.01	4.42	4.49	5.92				
Cleveland (city)	4.05	5.20 ^a	4.75 ^a	5.238 ^a	6.488 ^a	4.188	5.10	4.10	4.75	6.858	4.311	4.25	5.961				
Cleveland (country)	3.90	5.05 ^a	4.80 ^a	.....	.....	3.90	4.95	3.95	4.60	.....	4.10	.....	.....		
Cincinnati	4.116	5.268 ^a	.....	5.168 ^a	.....	4.394	.....	4.403	5.303	.....	4.444	4.453	5.944			
Chicago (city)	4.05	5.20 ^a	4.75 ^a	5.10 ^a	6.85 ^a	4.05	5.10	4.10	4.75	6.60 ¹²	4.10	4.25	5.75				
Chicago (country)	3.90	5.05 ^a	4.60 ^a	4.95 ^a	6.20 ^a	3.90	4.95	3.95	4.60	6.60 ¹²	3.95	4.10	5.60				
Milwaukee	4.249	5.399 ^a	4.949 ^a	5.299 ^a	6.549 ^a	4.249	5.299	4.299	4.949	6.899	4.299	4.449	5.949				
St. Paul	4.384 ^a	5.534 ^a	5.084 ^a	5.434 ^a	6.684 ^a	4.404 ¹³	.....	4.434 ¹²	5.726 ¹¹	7.084 ¹¹	4.434 ¹²	4.684 ¹²	6.084 ¹²			
Indianapolis	4.04	.....	4.84 ^a	5.29 ^a	6.54 ^a	4.24	.....	4.38 ¹²	5.26	.....	4.36	4.61	6.01			
St. Louis	4.199	.....	4.899 ^a	.....	6.674 ^a	4.199	.....	4.249	5.324 ¹²	7.074	3.999	3.999	5.999			
Birmingham (city)	3.85 ^a	.....	.....	5.20 ^a	.....	4.10 ²⁰	.....	4.05 ²⁰	5.83	.....	4.05	4.30	6.58			
Birmingham (country)	3.75 ²⁰	.....	.....	5.20 ^a	.....	4.00 ²⁰	.....	3.95 ²⁰	.....	.....	3.95	4.20	.....			
New Orleans	4.46 ²⁰	.....	5.77 ^a	.....	.....	4.83 ²⁰	.....	4.78 ²⁰	5.94 ¹¹	.....	4.68 ²⁰	5.03 ²⁰	6.94 ²⁰			
Houston, Tex.	5.00 ^a	.....	.....	6.00	.....	6.00 ^a	.....	5.85 ^a	.....	6.85	5.85	5.85	6.40			
Omaha, Nebr.	4.868	6.118 ^a	.....	5.918 ^a	7.168 ^a	4.862	.....	4.918	5.818 ¹¹	.....	4.918	5.068	6.568			
Los Angeles	5.55	.....	7.10 ^a	.....	8.10 ^a	5.65	8.35	5.10	6.90 ¹⁰	7.85	5.20	5.10	7.20			
San Francisco	4.90 ¹¹	.....	6.80 ^a	.....	7.35 ^a	5.20 ¹⁴	8.85 ¹⁴	4.75 ¹⁴	.....	9.35 ¹⁶	4.90 ¹⁴	5.00 ¹⁴	6.80 ¹⁴			
Tacoma, Wash. . . . .	.....	.....	.....	7.80 ^a	.....	5.30 ¹⁷	.....	5.00 ¹⁷	6.75 ¹⁹	8.50 ¹⁹	4.95 ¹⁷	5.15 ¹⁷	7.25 ¹⁷			
Seattle	5.50 ¹⁷	.....	.....	7.80 ^a	.....	5.30 ¹⁷	.....	5.00 ¹⁷	6.75 ¹⁹	8.50 ¹⁹	4.95 ¹⁷	5.15 ¹⁷	7.25 ¹⁷			

ase Quantities: 400 to 1999 pounds except as noted; Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 pounds and over; ^aany quantity; ^b300 to 1999 pounds; ^c150 to 2249 pounds; ^dthree to 24 bundles; ^e450 to 1499 pounds; ^fone bundle to 1499 pounds; ^gone to 39,999 pounds; ^h1000 to 39,999 pounds; ⁱ1000 to 39,999 pounds; ^j1000 to 14,999 pounds; ^k400 to 14,999 pounds; ^las rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents呈nealed bars; ^madd 0.46 for sizes not rolled in Birmingham; ⁿsame prices quoted for Jersey City, N. J.; ^oadd 15¢ for 100 lb for slow moving items; ^p18 gage and heavier; ^qrounds under ^r% in. 7.00c, ^s% in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over in. 8.25c at San Francisco.

PRICES OF LEADING FERROALLOYS PRODUCTS

ferroalloy: 19-21% Mn, 1-3% Si, 4% Cr, per gross ton, Palmerton, Pa., Pittsburgh, \$48. 16% to 19% Mn, 1-3% Si, per ton, Pittsburgh, \$47.

ferromanganese, standard: 78-82% gross ton, duty paid, \$135 fob Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. where Sloss-Sheffield Steel & Iron is producer; \$140.25 fob cars, Pittsburgh, including 75¢ switching charge, (where Carnegie-Illinois Corp. is producer); add \$8 for c.l., \$10 for ton, \$13.50 for ton; \$1.70 for each 1%, or 1.7¢ per ton contained manganese over 7% or under 78%.

ferromanganese, low carbon: East zone: Special, 21¢; regular, 50¢; medium, 14.50¢; central, 20¢; western, 18.40¢; eastern, 21.30¢; regular, 32¢; medium, 15.20¢. Prices are per pound contained Mn, bulk carlots, fob shipping point, freight allowed. Special low-carbon content of 90% Mn, 0.10% C, 0.06% P.

ferromanganese briquettes: (Weight approx. 3 lb and containing exactly 20% Mn) Prices per lb of briquettes: contract, bulk, carlots, 7.00¢; ton lots, 7.60¢; smaller lots, 8.40¢; eastern, 8.00¢; western, 8.80¢; central, 8.40¢; western, 8.40¢; ton lots, 10.90¢; western, spot up 25¢. Deduct 5¢ per lb for shipping point, freight allowed, per lb of contained Mn. Spot prices 0.25¢ higher on 80-90%, 0.30¢ on 75-80%.

ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80¢, ton lots 14.30¢, smaller lots 14.80¢; 75%, c.l. 11.05¢, ton lots 11.65¢; smaller lots 12.25¢; 50%, c.l. 9.00¢, ton lots 9.65¢; smaller lots 10.30¢. Deduct 1.00¢ for bulk carlots, 80-90% and 90-95%; 1.05¢, 75%; 1.20¢, 50%. Prices are per pound contained Si, freight allowed, per lb of contained Si. Spot prices 0.25¢ higher on 80-90%, 0.30¢ on 75-80%.

ferrotitanium: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots \$1.20, smaller lots \$1.30, eastern, freight allowed; 7.25¢, 7.85¢, 8.60¢, 9.00¢, central; 7.80¢, 8.40¢, 8.60¢ and 10.90¢; western, spot up 25¢. Deduct 5¢ per lb for shipping point, freight allowed, per lb of contained Ti. Spot prices 0.25¢ higher on 80-90%, 0.30¢ on 75-80%.

ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, lump, packed, eastern zone, freight allowed, c.l. 17.30¢, ton lots 17.90¢, smaller lots 18.60¢; central zone, add 0.40¢ for c.l. and 1.30¢ for smaller lots; western zone, add 0.55¢ for c.l. and 2.10¢ for smaller lots. Deduct 0.60¢ for bulk carlots, 1.00¢ for smaller lots; western, spot up 25¢.

ferrocolumbium: (C 60-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00¢; packed carlot 21.80¢, ton lots 22.35¢; smaller lots 23.35¢; eastern, freight allowed, per pound of contained Cr; 21.40¢, 22.20¢, 23.00¢, and 24.00¢; central; 21.50¢, 22.30¢, 24.20¢ and 25.20¢; western, spot up 25¢.

ferrochrome briquettes: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35¢, ton lots 10.75¢, smaller lots 11.15¢; central zone, add 0.25¢ for c.l. and 0.90¢ for smaller lots; western zone, add 0.55¢ for c.l. and 2.10¢ for smaller lots. Deduct 0.50¢ for bulk carlots. Prices per pound of briquettes; spot prices 0.25¢ higher; notched, 0.25¢ higher.

chromium metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr, bulk, c.l. 79.50¢, 2000 lb to c.l. 80¢; central 81¢ and 82.60¢; western 82.25¢ and 84.75¢, fob shipping point, freight allowed.

chromium-copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45¢ eastern, Niagara Falls, N. Y., basis freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2¢.

calcium metal: cast: Contract, ton lot or more, \$1.60; 100 to 1999 lb, \$1.95; less than 100 lb, \$3.15 per lb of metal; eastern zone; \$1.615, \$1.965 and \$3.185; western; spot up 5¢.

calcium-manganese-silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10¢, ton lots 17.60¢, smaller lots 18.60¢, eastern, freight allowed on 80-90%, 0.30¢ on 75-80%.

calcium metal: cast: Contract, ton lot or more, \$1.60; 100 to 1999 lb, \$1.95; less than 100 lb, \$3.15 per lb of metal; eastern zone; \$1.615, \$1.965 and \$3.185; western; spot up 5¢.

calcium-manganese-silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10¢, ton lots 17.60¢, smaller lots 18.60¢, eastern, freight allowed on 80-90%, 0.30¢ on 75-80%.

calcium metal: cast: Contract, ton lot or more, \$1.60; 100 to 1999 lb, \$1.95; less than 100 lb, \$3.15 per lb of metal; eastern zone; \$1.615, \$1.965 and \$3.185; western; spot up 5¢.

calcium-manganese-silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10¢, ton lots 17.60¢, smaller lots 18.60¢, eastern, freight allowed on 80-90%, 0.30¢ on 75-80%.

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l. 14.10c; 2000 lb to c.l. 15.60c; central, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about 1/2 lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2 1/2 lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central

zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn, max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central, 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more; Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1 1/2c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots \$1.89, less \$2.01, eastern, freight allowed; \$1.903 and \$2.023, central; \$1.935 and \$2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more \$1.90, 1 ton to 5 tons \$2.00, smaller lots \$2.10, eastern, freight allowed; \$1.9125, \$2.0125 and \$2.1125, central; \$1.9445, \$2.0445 and \$2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; freight allowed; 14.80c, 15.625 per lb contained B, fob Philo, 17.10c, 17.85c, central; 14.80c, 15.90c, 19.80c, western.

Zirconium alloy: 12-15%, per lb alloy, eastern, contract, bulk, lots 5.50c, packed, carlots 6.10c, ton lots 6.40c, smaller lots 6.70c spot up 0.25c.

Zirconium alloy: Zr 35-40%, east contract, packed, carlots 17.00c, lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alisifer: (Approx. 20% Al, 40% 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; lots 6.75c; smaller lots 7.25c. spot up 4c.

Simanil: (Approx. 20% each Si, Al) Packed, lump, carload 9c, lots 9.25c, smaller lots 9.75c per lb; freight not exceeding St. Louis.

Tungsten Metal Powder: Spot, less than 98.8%, \$2.80, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 87.5c; No. 6, 60c; No. 79, 45c; fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89.92% and 5.84% Na_2O ; or air dried, 85% V_2O_5 and 5.15% Na_2O , \$1 per lb contained V_2O_5 fob freight allowed on quantities of 1b and over to St. Louis.

Remelt Nonferrous Metal Prices Ease

New York — Roger W. Straus, president, American Smelting & Refining Co., told stockholders last week that in his opinion "metal prices have reached their peak and the next movement would be downward. However, because of sharply increased cost for labor and materials I do not think prewar metal prices can get out the needed production. Therefore, the future levels of such prices will be higher than the average before the war."

To counteract the expected deficiency in domestic supplies, the government is taking action to help improve the situation. A suggestion that the United States make provision for supplies of tin, copper and other materials now short in this country, in agreeing to furnish American loans to foreign countries has been advanced by Senator Homer E. Capehart. Congress has passed the Patterson bill suspending the excise tax on copper for two years, thereby removing an obstacle to increased copper imports.

COPPER—The bill passed by Congress last week provides for a suspension of the import tax on copper materials which was imposed under section 3425 of the Internal Revenue Code. The tax will not apply with respect to articles other than copper sulphate entered for consumption or withdrawn from warehouses for consumption during the period beginning with the day following enactment of the act (it still requires the President's signature) and ending with the close of Mar. 31, 1949.

The trade watched the price situation closely, since foreign and domestic prices are expected to move closer to an equivalent level. Sales were made last week in foreign copper at 23.75c, fob New York, while domestic copper held at 21.50c, Connecticut valley.

Office of Metals Reserve expects the copper stockpile on May 1 to be about 16,000 tons plus a possible 8000 additional tons released by the Army. Outstanding contracts call for delivery abroad of about 2750 tons of copper a month for the balance of the year.

Declines of up to 3/4-cent in secondary aluminum and up to 1-cent in brass and bronze ingots follows weakness in scrap metals

Copper consumption by fabricators during March declined to 117,981 tons from a revised figure of 118,663 tons for February and compares with refined copper deliveries by primary producers to the fabricators in March of 123,590 tons.

General Cable Co. last week announced average price reductions on its wire products ranging from 6 per cent to 12 per cent. This action was taken despite a recently granted wage increase of 1 1/2 cents per hour and in the face of record-breaking order backlogs. The company also is canceling escalator clauses, thus stabilizing prices except for fluctuations in copper and lead prices.

BRASS INGOTS—Due to an easier scrap situation, manufacturers reduced prices 3/4-cent to 1 cent a pound on many grades of brass and bronze ingots last week. The reductions included a cut of 1 cent per pound on all items in the 85-5-5 group; 1/2-cent and 1 cent per pound on a few items in the 88-10-2 group; and 3/4-cent a pound on all items but four in the 80-10-10 group. Current deliveries of the brass ingot makers are holding up well; new business is slow.

LEAD—Although most observers feel certain that the lead supply situation will continue to improve, demand has not slackened and producers find a ready market for all available metal. About 40 per cent of the metal to be available in May has been booked with sellers still rationing supplies to their customers. Prices held unchanged last week at 14.80c to 14.85c, East St. Louis.

ZINC—Activity in the domestic market remained quiet last week with prime western holding unchanged at 10.50c, East St. Louis. F. H. Brownell, head of

Federal Mining & Smelting Co., said recently that in his opinion the Premium Price Plan would not be renewed on July 30 and that his company's operations in the Tri-State district would undoubtedly cease with lapse of the program.

TIN—Tin Processing Corp. received last week its first shipment of tin of 2100 tons, from the Netherlands Indies since the war. The interruption rail shipments at the Longhorn smelt resulting from the Texas City, Tex., disaster was not serious.

ALUMINUM—Cuts ranging from 1/4-cent to 3/4-cent a pound in remelted aluminum ingots were announced last week by several of the leading smelters. Prices for the steel deoxidizing grade were reduced uniformly 1/2-cent a pound. These reductions were due to the recent weakening in scrap aluminum price.

ANTIMONY—Despite some improvement in domestic production of antimony, the 1947 supply will not support consumption at the 1946 rate, the Civil Production Administration forecasts. Consumption of primary and secondary antimony in the United States was 37,300 short tons in 1946 and exceeded new supplies by nearly 8000 tons. This deficit was made up by large withdrawals from stocks of the Office of Metals Reserve which are now near exhaustion.

Copper Imports Rise; Tin, Nickel, Ferroalloys Drop

Washington—Imports of copper taled 42 million pounds, valued at \$800,000 in February, against 41 million pounds valued at \$5,700,000 in January according to the Department of Commerce. Other imports for the same comparative months were, respectively, 939,000 pounds valued at \$500,000 and 2,878,000 pounds valued at \$1,900,000 nickel and alloys, 12,045,000 pounds valued at \$3,400,000 and 16,389,000 pounds valued at \$4 million; ferroalloy ores, 1 million against \$5,400,000.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, del. Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, 21.25c, refinery, 20,000 lb or more; 21.50c, less than 20,000 lb.

Brass Ingots: 85-5-5-5 (No. 115) 20.50c; 88-10-2 (No. 215) 27.25c; 80-10-10 (No. 305) 24.50c; No. 1 yellow (No. 405) 16.25c; carlot prices, including 25¢ per 100 lb freight allowance; add ¼c for less than 20 tons.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del. carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 15.00c-15.25c; No. 12 foundry alloy (No. 2 grade) 14.50c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95.97½%) 5.50c; grade 2 (92.95%) 14.50c; grade 3 (90.92%) 13.75c; grade 4 (85.90%) 13.25c. Above prices for 30,000 lb or more; add ¼c 0.000-30,000 lb; ½c 5000-10,000 lb; ¾c 0.000-5000 lb; 1½c less than 1000 lb. Prices include freight at carload rate up to 75¢ per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, 17 lb) 20.50c per lb, carlot; 22.50c 100 lb to c.l. Extruded 12-in. sticks 4.00c-38.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, ½c 500-999, 3c under 500. Grade A, 99.8% higher (includes Straits), 80.00c; Grade A, 99.8% or higher, not meeting specifications or Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl. 79.40c; Grade E, 99.49-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, ex., 99.0% to 99.8% and 99.8% and over but meeting specifications below, 33.00c, 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 5. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes refinery, unpacked 35c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; ½c nickel shots or ingots for additions to cast on 35.00c lb. Prices include import duty.

Mercury: Open market, spot, New York, \$85-8 per 76-lb flask.

Sulfuric Acid: Prime, white, 99%, carlots, 4.00c lb.

Pyrrhotite-Copper: 3.75-4.25% Be, \$14.75 per contained Be.

Diamond: Bars, ingots, pencils, pigs, plates, etc., slabs, sticks, and all other "regular" wrought or flat forms \$1.75 lb, del.; anodes,ills, discs and all other special or patented shapes, \$1.80.

Pewter: 97-98%, \$1.50 lb for 550 lb (keg); .52 lb for 100 lb (case); \$1.57 lb under 100 lb.

Gold: U. S. Treasury, \$35 per ounce.

Sodium: 99.9%, \$2.25 per troy ounce.

Silver: Open market, N. Y., 75.62½c per ounce.

Patinum: \$62-\$66 per ounce.

Palladium: \$24 per troy ounce.

Iridium: \$85-\$95 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 32.93c; yellow brass 28.88c; commercial bronze, 95% 32.97c, 90% 32.36c red brass, 85% 31.24c, 80% 30.63c; best quality 29.89c; Everdur, Duronite, Herculoy or equiv., cold-drawn, 37.71c; nickel silver, 18%, 41.54c; phosphor bronze, grade A, 5%, 50.75c.

Rods: Copper, hot rolled 29.28c, cold drawn 30.28c; yellow brass, free cutting, 23.64c, not free cutting 28.57c; commercial bronze, 95% 32.66c, 90% 32.05c; red brass, 85% 30.93c, 80% 30.32c; best quality 29.58c.

Seamless Tubing: Copper 32.97c; yellow brass 31.64c; commercial bronze 90% 34.77c; red brass 85% 33.90c, 80% 33.29c; best quality brass 32.30c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 31.13c, 15,000 lb or more 31.38c, less carlots 31.88c.

Aluminum Sheets and Circles: 2s and 3s flat mill finish, base 30,000 lb or more del.; sheet widths as indicated; circle diameter 9" and larger:

Gage	Width	Sheets	Circles
.249"-7	12"-48"	22.70c	25.20c
8-10	12"-48"	23.20c	25.70c
11-12	26"-48"	24.20c	27.00c
13-14	26"-48"	25.20c	28.50c
15-16	26"-48"	26.40c	30.40c
17-18	26"-48"	27.90c	32.90c
19-20	24"-42"	29.80c	35.30c
21-22	24"-42"	31.70c	37.20c
23-24	3"-24"	25.60c	29.20c

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq ft; 75c, 10 to 20 sq ft and circles.

Pipe: Full coils 17.50c; cut coils 17.75c.

Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chrome Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electro-deposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz balls, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c, 500 to 1000 lb, 95.25c, 200 to 500 lb, 95.75c; less than 200 lb, 96.25c, fob Newark, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.

To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.

To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 9999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

Prices for less than 15,000 lb fob shipping point. Add ½c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean	Rod	Clean
	Heavy	Ends	Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250

	Clean	Rod	Clean
Commercial Bronze	18.000	17.750	17.250
90%	17.500	17.250	16.750

	Clean	Rod	Clean
Red brass	17.250	17.000	16.300
85%	16.875	16.625	16.125
80%	16.125	15.875	15.375
Best Quality (71-79%)	14.125	13.875	13.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS

BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 18.00c, No. 2 copper 17.00, light copper 16.00, composition red brass 15.75, auto radiators 12.25, heavy yellow brass 11.25, brass pipe 11.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper, 19.50; No. 2 copper, 18.50, light copper 17.50; refinery brass (60% copper), per dry copper content less \$5 smelting charge for brass analyzing 60 per cent or more, 17.62½c.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.50-17.00; No. 2 15.50-16.00; light copper 14.25-14.75; No. 1 composition red brass 13.75-14.00, No. 1 composition turnings 13.75-14.25 mixed brass turnings 8.50-9.00, new brass clippings 12.50-13.00, No. 1 brass rod turnings 13.00-13.50, light brass 8.00-8.50, heavy yellow brass 8.50-9.00, new brass rod ends 13.50-13.75, auto radiators, unsweated 11.00-11.50, clean red car boxes 12.00-12.50, cocks and faucets 11.00-11.25, brass pipe 10.50-11.00.

Lead: Heavy lead 12.50, battery plates 7.50-7.75, linotype and stereotype 13.50-14.00, electrotypes 11.50-12.00, mixed babbitt 13.50-14.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.50-6.00, new die cast scrap 4.50-5.00, old die cast scrap 3.50-4.00.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 50.00-52.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 8.50-9.00, old sheets 7.00-7.25, crankcase 7.00-7.25, borings and turnings 2.00, pistons, free of struts, 5.50-6.00.

Nickel: Anodes 19.50-20.50, turnings 16.50-17.50, rod ends 19.00-20.00.

Mone: Clippings 14.00-15.00, turnings 9.00, old sheet 12.00-13.00, rods 12.50-13.00, castings 10.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	\$32.00-32.50
No. 2 Heavy Melt. Steel	32.00-32.50
No. 1 Busheling	32.00-32.50
Nos. 1, 2 & 3 Bundles	32.00-32.50
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	27.00-28.00
Short Shovel Turnings	29.00-30.00
Cast Iron Borings	28.00-29.00
Bar Crops and Plate	39.00-40.00
Low Phos. Cast Steel	39.00-40.00
Punchings & Plate Scrap	39.00-40.00
Elec. Furnace Bundles	39.00-40.00
Heavy Turnings	31.50-32.00
Alloy Free Turnings	29.50-30.00
Cut Structural	38.00-40.00
No. 1 Chemical Borings	31.00-32.00

Cast Iron Grades

No. 1 Cupola	42.00-42.50
Charging Box Cast	35.00-36.00
Heavy Breakable Cast	34.00-35.00
Stove Plate	37.50-38.00
Unstripped Motor Blocks	37.50-38.00
Malleable	45.50-46.00
Brake Shoes	35.00-36.00
Clean Auto Cast	41.50-42.50
No. 1 Wheels	42.00-42.50
Burnt Cast	35.00-36.00

Railroad Scrap†

No. 1 R.R. Heavy Melt.	38.00
R.R. Malleable	48.00-49.00
Axles	44.00-45.00
Rails, Rerolling	41.00-42.00
Rails, Random Lengths	38.00-39.00
Rails, 3 ft and under	42.00-43.00
Rails, 18 in. and under	43.50-44.00
Railroad Specialties	42.00-43.00
Uncut Tires	39.00-41.00
Angles, Splice Bars	41.00-42.00

† Nominal.

CLEVELAND

No. 1 Heavy Melt. Steel	\$31.50
No. 2 Heavy Melt. Steel	31.00
No. 1 Busheling	31.00
Nos. 1 & 2 Bundles	31.00
Machine Shop Turnings	26.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings	27.00-28.00
Cast Iron Borings	26.00-27.00
Bar Crops and Plate	37.00-37.50
Cast Steel	37.00-37.50
Punchings & Plate Scrap	37.00-37.50
Elec. Furnace Bundles	35.50-36.00
Heavy Turnings	33.00-34.00
Alloy Free Turnings	30.00-30.50
Cut Structural	40.00

Cast Iron Grades

No. 1 Cupola	45.00
Charging Box Cast	38.00
Stove Plate	38.00
Heavy Breakable Cast	42.00
Unstripped Motor Blocks	40.00
Malleable	57.00-58.00
Brake Shoes	43.00
Clean Auto Cast	45.00
No. 1 Wheels	43.00
Burnt Cast	42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.50-38.00
R.R. Malleable	57.00-58.00
Rails, Rerolling	46.00-48.00
Rails, Random Lengths	45.00-48.00
Rails, 3 ft and under	48.00
Railroad Specialties	45.00
Uncut Tires	44.00
Angles, Splice Bars	46.50-47.50

VALLEY

No. 1 Heavy Melt. Steel	\$32.00
No. 2 Heavy Melt. Steel	32.00
No. 1 Bundles	32.00
Machine Shop Turnings	26.00-27.00
Short Shovel Turnings	28.00-29.00
Cast Iron Borings	27.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	38.00
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MANSFIELD

No. 1 Heavy Melt. Steel	\$32.00
Machine Shop Turnings	26.00
Short Shovel Turnings	28.00

CINCINNATI

No. 1 Heavy Melt. Steel	\$31.00
No. 2 Heavy Melt. Steel	31.00
No. 1 Busheling	31.00
No. 1 Bundles	31.00
No. 2 Bundles	31.00
Machine Shop Turnings	24.00
Mixed Borings, Turnings	22.00
Short Shovel Turnings	25.00
Cast Iron Borings	25.00

Cast Iron Grades

No. 1 Cupola Cast	42.00
Charging Box Cast	33.00
Heavy Breakable Cast	35.00
Stove Plate	31.00
Unstripped Motor Blocks	34.00
Brake Shoes	30.00
Clean Auto Cast	40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	34.00
R.R. Malleable	44.00
Rails, Rerolling	37.00
Rails, Random Lengths	37.00
Rails, 18 in. and under	44.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	\$29.50-30.00
No. 1 Busheling	29.50-30.00
Nos. 1 & 2 Bundles	29.50-30.00
No. 3 Bundles	29.50-30.00
Machine Shop Turnings	23.50-24.00
Mixed Borings, Turnings	23.50-24.00
Short Shovel Turnings	24.50-25.00
Cast Iron Borings	24.50-25.00
Punchings & Plate Scrap	34.00-34.50

Cast Iron Grades

No. 1 Cupola Cast	36.00-38.00
Heavy Breakable Cast	28.00-29.00
Clean Auto Cast	36.00-38.00

BUFFALO

No. 1 Heavy Melt. Steel	\$30.50-31.50
No. 2 Heavy Melt. Steel	30.50-31.50
No. 1 Busheling	30.50-31.50
No. 1 & 2 Bundles	30.50-31.50
No. 3 Bundles	30.50-31.50
Machine Shop Turnings	22.50-23.50
Mixed Borings, Turnings	22.50-23.50
Short Shovel Turnings	24.50-25.50
Cast Iron Borings	22.50-23.50
Punchings & Plate Scrap	32.00-34.00
Elec. Furnace Bundles	36.00-37.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-42.00
Charging Box Cast	38.00-39.00
Heavy Breakable Cast	36.00-37.00
Stove Plate	35.00-37.00
Malleable	40.00-41.00
Clean Auto Cast	38.00-39.00
No. 1 Wheels	38.00-39.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	\$30.00-31.00
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Busheling	29.00-30.00
No. 1 Bundles	30.00-31.00
No. 2 Bundles	27.00-28.00
No. 3 Bundles	26.00
Machine Shop Turnings	23.00-24.00
Mixed Borings, Turnings	21.00-22.00
Short Shovel Turnings	24.00-24.50
Bar Crops and Plate	34.00-35.00
Punchings & Plate Scrap	34.00-35.00
Elec. Furnace Bundles	31.00-32.00
Heavy Turnings	30.00-31.00
Cut Structural	34.00-35.00
No. 1 Chemical Borings	31.50-32.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-46.00
Charging Box Cast	40.00-42.00
Heavy Breakable Cast	40.00-42.00

Unstripped Motor Blocks	42.00-42.50
Malleable	48.00-49.00
Clean Auto Cast	45.00
No. 1 Wheels	46.00-47.50

NEW YORK

(Dealers buying prices, fob shipping point)	
No. 1 Heavy Melt. Steel	\$25.00-27.00
No. 2 Heavy Melt. Steel	25.00-27.00
No. 1 Busheling	25.00-27.00
Nos. 1 & 2 Bundles	25.00-27.00
No. 3 Bundles	25.00-27.00
Machine Shop Turnings	18.00-19.00
Mixed Borings, Turnings	18.00-19.00
Short Shovel Turnings	21.00
Punchings & Plate Scrap	27.00-28.00
Elec. Furnace Bundles	26.00
Cut Structural	24.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-42.00
Charging Box Cast	40.00
Heavy Breakable Cast	33.00-32.00
Stove Plate	38.00-39.00
Malleable	48.00-49.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	\$24.00-25.00
No. 2 Heavy Melt. Steel	24.00-25.00
No. 1 Busheling	24.00-25.00
Nos. 1 & 2 Bundles	24.00-25.00
No. 3 Bundles	24.00-25.00
Machine Shop Turnings	17.00-18.00
Mixed Borings, Turnings	16.00-17.00
Short Shovel Turnings	18.00-19.00
Bar Crops and Plate	31.00-32.00
Punchings & Plate Scrap	31.00-32.00
Chemical Borings	20.00-21.00

Cast Iron Grades

No. 1 Cupola Cast	38.00-40.00
Charging Box Cast	36.00-37.00
Heavy Breakable Cast	38.00-39.00
Stove Plate	35.00
Unstripped Motor Blocks	33.50-34.50
Clean Auto Cast	40.00-41.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	\$22.50-23.00
No. 2 Heavy Melt. Steel	22.00-23.00
No. 1 Busheling	22.00-23.00
Nos. 1 & 2 Bundles	22.00-23.00
No. 3 Bundles	22.00-23.00
Machine Shop Turnings	15.00-16.00
Mixed Borings, Turnings	15.00-16.00
Short Shovel Turnings	15.00-16.00
Bar Crops and Plate	23.00-24.00
Punchings & Plate Scrap	23.00-24.00
Cut Structural	21.50

Cast Iron Grades

Sheets, Strip . . .

Close watch being kept on inventories. Slight easing seen in fourth quarter

Sheet Prices, Page 156

Pittsburgh—Despite large expansion in old reduction rolling mill facilities this year, most sellers do not anticipate any significant easing in pressure for prompt deliveries until late this year at the earliest. Sellers report very few cancellations and delivery deferments. There

little indication as to the inventory status of sheet and strip consumers, although the general impression is that inventories are well below normal in relation to current high level of operations. A particularly short supply are galvanized and electrical sheets, although sellers state that current output is falling far short for all sheet and strip items. Despite the general scarcity of sheets and strip, manufacturers are more closely watching finished goods inventory position so as not to become too extended event of a brief recession developing at buyers' resistance to present high prices.

New York—While sheet mills generally are adhering rigidly to the booking carbon tonnage on a quarterly basis, one large interest is now accepting a little tonnage for July and August from diversified consumers, and another is accepting specifications for the entire third quarter from car builders, but from these interests only on that basis. It should be another two or three weeks before sheet mills generally begin entering orders for the third quarter on carbon material.

In addition to hot and cold carbon sheets, stringency still prevails in enameling stock and galvanized sheets. While we predict fourth quarter will see an easing in the entire sheet picture—even summing a high rate of operations—by the fourth quarter, other trade interests holding to their original beliefs that easing before next year will be extremely light. There is a continued slight betterment in electrical sheet promises, with the situation still far from easy, which leaves only stainless steel and certain other specialties in a really bad position.

Boston—Filling of supply pipe lines and resistance to high prices on some consumer products are resulting in scattered revisions in estimated flat-rolled requirements. Some shipments have been deferred and a few canceled as production schedules are readjusted, involving changes in sizes and grades. Buyers generally are more conservative and selective in placing new orders, although demand for sheets and strip continues in excess of supply. Openings are readily filled and pressure from warehouses for rolled is notably strong. Fluorescent lighting fixtures and some electrical appliance manufacturers are affected by slackening in demand from distributing channels where high-priced inventories are backed up. Significant also is an improved tonnage of wasters and rejected lots.

Philadelphia—Sheet steel producers are catching up slightly on their order backlog, due primarily to close control of the acceptance of orders. There is still a greater demand than supply, while some trade interests look for generally easier situation by the fourth

quarter, others see little real improvement in this respect before sometime next year. Stainless steel is virtually the only sheet item in which there is now a fair balance between supply and demand, and, in this case, sellers are no longer allocating tonnage on a quarterly basis. Producers of carbon sheets should begin opening books within the next two weeks.

Chicago—Were it not for the fact that several sheet and strip makers withdrew from this market some time ago, mills might be experiencing a somewhat lessened demand for their products. However, pressure continues strong because consumers who lost their source of supply are turning to local sources for their requirements. Mills and their customers, nevertheless, are aware of the declining demand for consumers' goods which is resulting from current high prices. Because of this, manufacturers are trying to hold inventories down.

Cincinnati—Demands for sheets are pressing, the impact on mill interests being perhaps stronger than during the war years. Commitments on original schedules for the quarter are being followed closely, but deliveries will likely show effects of the car building program requirement to which have been added promises for home building.

St. Louis—Reduced local pig iron production, two recent strikes and repair shutdowns have set back sheet output in this district an equivalent of a year's production, April, 1946, schedules are being rolled currently in both hot and cold sheets and a few 1945 orders are still hanging over. Housing and railroad car priorities also have contributed to the delay. Books for 1947 are not yet open. There have been few order cancellations or specification changes.

Consumers are sitting tight for developments. Meanwhile, a new machinists strike threatens at Granite City Steel Co.

Sheet demand and pressure for deliveries are heavy. With the exception of Carnegie-Illinois and Inland, eastern mills have stopped shipping to this area. Formerly they supplied 30 to 40 per cent of its needs.

Pig iron for sheets remains on half rations, with one of Koppers' two local blast furnaces off for repairs. Cast scrap is being substituted wherever possible for pig in flat steel melts. Pig ratio had already been reduced to 17 per cent compared to the 25 per cent normal.

Birmingham—Stringency in sheets remains marked with strip, generally speaking, in much less demand. Consumers are interested as a rule in obtaining sheet tonnage already booked rather than in trying to place new tonnage, although mild weather had intensified demand for roofing sheets.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 156

Seattle—Capacity operations are reported by local rolling mills which have sizable order backlog. A large volume of reinforcing bar business in small lots has been taken recently, preference being given to regular customers and emergency public works. Several large projects are up for early placement.

Seattle—Steady demand for merchant bars is reported here but volume of business is below that for reinforcing bars. Capacity operations are being maintained by bar mills.

Sheet & Tube Sets Up New Cold-Drawn Sales Division

Youngstown Sheet & Tube Co., Youngstown, is increasing its activity in the cold-drawn bar market. The company's new mill at the Brier Hill Works is nearing completion, although delivery of some equipment has been delayed and will restrict the range of products to be produced this year.

The company has been offering rounds up to $\frac{1}{2}$ -in. for some time and on completion of the new mill will offer various shapes and larger sizes, probably up to 2-in. standard and special tolerances, polished, ground, etc. At present it is accepting third quarter orders for rounds and hexagons.

Heading the new Cold Drawn Bar Sales Division is W. W. Brown who also continues as manager of sales of hot-rolled carbon bars and semifinished produced in the Youngstown district.

C. H. Longfield, general manager of sales for the company, also announced that a Western Carbon Bar & Semifinished Division has been established with W. J. MacKenzie, Chicago, in charge. This division will cover the Indiana Harbor production of these items. Mr. MacKenzie will also continue as manager of alloy sales.

Mr. Longfield also announced that L. V. Kuhnle has been appointed manager of rod and wire sales and H. H. Smith manager of high strength (Yoloy) sales.

Steel Bars . . .

Bar Prices, Page 156

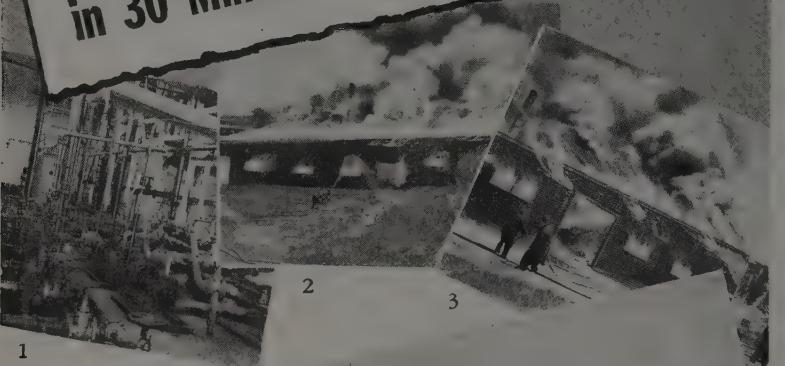
New York—Except for the very large rounds, which have been in sluggish demand for some time, hot carbon bar deliveries are still tight. Openings in the medium sizes have developed, which was not the case earlier in the year, but the overall picture in these medium sizes is still very tight, and in the small sizes there appears to be no easing whatsoever.

Generally speaking, producers are taking little tonnage for shipment beyond the end of this quarter in hot carbon steel. One large interest is accepting specifications for car construction for the third quarter and at least another is taking some business for July and August, but there has been no suggestion of a general opening of books for the three months beginning July 1.

In cold drawn bars, processors are less conservative. For some time they have been entering orders for third quarter where the tonnage is attractive, and in some cases they are now even entering business for shipment in fourth quarter. As in hot-rolled bars, the particular pressure for cold drawn steel is in the small sizes. Alloy bar deliveries remain decidedly easy, with most sellers able to promise shipments within four to six weeks on a variety of sizes.

Boston—Substantial progress is expected this quarter in reducing cold-finished bar order backlog, even in smaller sizes. For some time, supply of alloy, stainless and tool steel bars has been more than

*... fire destroys
\$500,000 Plant
in 30 Minutes . . .*



1

2

3

4

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3. In 30 minutes the roof and two walls had collapsed. A few seconds later, the remaining walls fell.
4. 90 minutes after the fire started—this is all that was left of a \$500,000 specialized processing plant—twisted metal and smoking rubbish. C-O-Two systems detect fires at once and put them out instantly, before they cause excessive damage.

If your plant has special fire hazards such as electrical equipment, diesel engines, spray booths, dip tanks, blueprint and record vaults or cooking vats, be sure they are protected. C-O-Two, the modern fire extinguishing agent, is safe to use on live electric equipment; it does not corrode metals, injure fabrics and finishes nor contaminate food. C-O-Two is available in sizes for every type risk: famous Squeeze-Grip portables, wheeled and hose reel units, automatic or manually operated fixed pipe systems, smoke detecting systems and heat-actuated fire detecting systems. A C-O-Two distributor or one of our engineers will help you plan safe, modern fire protection. Write for further information.

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balanced with demand which is quite light when compared with that for smaller sizes of hot-rolled carbon bars. Pressure for carbon steel bars has eased moderately and progress is apparent in the lower size ranges of cold-drawn. More users, including forge shops, are buying on an inventory basis, confining new orders largely to sizes and grades of which they are short. Balance of stock alloys, stainless and tool steels are definitely competitive for new volume.

Philadelphia — Hot-carbon bar producers are expected to open their thin quarter books soon and, in the case of carbon steel, some already have done so. Cold drawers are accepting tonnage for third quarter and even beyond in some instances. Meanwhile, there is little future contracting in alloy bars for the reason that supplies are easily available for shipment within four to six weeks. Small sizes of carbon bars continue in strong demand and, while there is a little less pressure for the medium sizes, demand still exceeds supply. Only in the large sizes does there appear to be any real easing in supply and this has long been in evidence.

Pittsburgh — Requirements for merchant carbon bars in smaller size range show no signs of easing, and present output continues under strict allocation. However, sellers report large sizes are now available within two months, reflecting the general easing in demand since the first of the year. Requirements for cold-drawn bars have recorded little change, although some consumers are watching inventories more closely than six months ago. Supply situation in hot-rolled alloy bars continues in good balance with demand; most mills now are able to promise delivery within four to six weeks.

Cleveland — Bar mills have a large volume of business on their books, although buying pressure is now concentrated on sizes up to 1½ inches. Demand is still heavy for larger sized bars with consumers absorbing all available offerings. Second quarter quotas have been maintained at the same level as in the first period. While not as tight as sheet and strip, no cancellations of consequence have been received by leading sellers.

Chicago — Alloy bars are in comparatively easy position, and large sizes of carbon bars show more noticeable trends in the same direction. There is no letup, however, for small sizes of carbon bars. Evidence that consumers are unable to obtain sufficient quantities of the latter is the fact that so many are arranging with mills for conversion of semifinished material they have been able to acquire. One barmaker, which has been handling a considerable volume of conversion business, reports that all of its available rolling capacity is engaged and for some time ahead. It would seem that any easing of demand would appear first in conversion tonnage.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 158

Philadelphia — The leading district producer of by-product foundry coke has made further drastic cuts in consumer quotas, effective over at least the remainder of the year. The ovens have been in continuous operation for 28 years and major repairs have become imperative. Reduction in foundry coke is estimated at 30 per cent.

Steel Plate . . .

Plate Prices, Page 157

New York—Plate producers are still unable to keep abreast of demand. Crowded schedules are forcing them to turn down considerable inquiry, and while sellers look for a somewhat easier position by the end of third quarter, this opinion is not held universally, even assuming that there will be no coal strike this summer, a matter about which most are none too optimistic.

Tank makers assert they could operate at a much more active rate if they were able to obtain enough plates to keep their inventories in balance. So heavy is the demand for fuel oil storage tanks, both domestic and industrial, because of the continued uncertain outlook on coal, that some fabricators could book twice their present volume if they could but promise delivery by early this fall.

Leading tank orders reported here recently include 1700 tons for Buckley Bros., Bridgeport, Conn., placed with the Bethlehem Steel Co., Bethlehem, Pa., and 500 tons for 21 tanks for the Carbon & Carbide Chemical Co., New York, with the Chicago Bridge & Iron Works, Chicago. These latter tanks are for Texas City, Tex., but were under negotiation before the recent disaster at that point.

Boston—Plate fabricators ultimately will be favored with lower steel prices in most instances as supply improves. In fourth quarter, more difficulty is expected in getting premium prices, although these may be supported by export demand, if sustained at current levels with licenses available. Plates are about the tightest product with most warehouses and shipments to tank shops and miscellaneous fabricators have shown little improvement. Demand for universal plates for freight car building will increase over the remainder of the year. Most welding and flame cutting shops will use more heavy plates.

Philadelphia—Plate demand shows little easing and while producers are reducing their backlog somewhat, this is due to restricted selection of tonnage offered. Some mills, having originally looked themselves far into the future, are virtually out of the market at present. Those selling on a quarterly quota basis are expected to open books for the third quarter in the near future. Some already have done so on car steel and in one or two instances producers are accepting some tonnage from miscellaneous sources for shipment in July and August.

Cleveland—Leading seller of plates in this district reports continued heavy demand for quality plates as well as flange heads. Booking on an allotment system, he is now entering orders for July delivery and is being forced by lack of supply to refuse quite a large volume of business being received from nonregular customers. There have been no cancellations so far and no indication of an easing in the supply situation through the third quarter.

Birmingham—Plates continue exceptionally tight and with little indication that will be otherwise at least for a long time. While there has been some slowing down in tank production, invariably there is demand from some new regular quarters to account for all the plate produced and keep the backlog usually unchanged. Most plate users would operate at greater capacity if their stocks were in better balance.



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Wire . . .

Wire Prices, Page 157

Pittsburgh—Continued heavy pressure for prompt shipment is reported by all producers for bulk of wire products. One of the few exceptions in the current demand-supply situation is that for wire rope, with some producers operating well below former pace. Among the merchant wire products, barbed wire and fence posts particularly are in short supply, while in manufacturers' wire demand remains extremely heavy for valve spring wire, electrical wire and cables. Acute shortage of wire rods continues to retard output of nonintegrated wire producers.

The size extra brackets for wire rods have been revised as follows: 7/32 to 1/4-inch, base; heavier than 1/4 inch to 5/16 inch, 15 cents; over 5/16 to 15/32-inch, 25 cents; and over 15/32 to 47/64-inch, 20 cents. This new size extra schedule represents reductions up to \$5 per ton from the previous schedule. The former normalizing extra of 50 cents per 100 pounds on wire rods has been cut to 40 cents. Spheroidizing extra has been raised from 75 cents to \$1. The manganese extra is now 10 cents for any restriction under standard chemical range down to narrowest acceptable restrictive range; formerly, this extra was 5 cents for each per cent restriction under chemical range.

For basic or bessemer manufacturers' wire, the former size extra brackets have been reduced to two size ranges as follows: Larger than 1/4 to 13/32-inch, 25 cents; over 13/32-inch, 20 cents. Formerly these extras were 15 cents for over 1/4 to 5/16-inch; 50 cents for over 5/16 to 11/32-inch; 40 cents for over 11/32 to 18/32-inch; 30 cents for over 18/32 to 31/64-inch; and 20 cents for over 31/64 to 1 inch. Revisions in normalizing, spheroidizing and manganese extras are same as for wire rods.

The coppered or liquor finish extra for stapping wire has been increased 75 cents per 100 pounds.

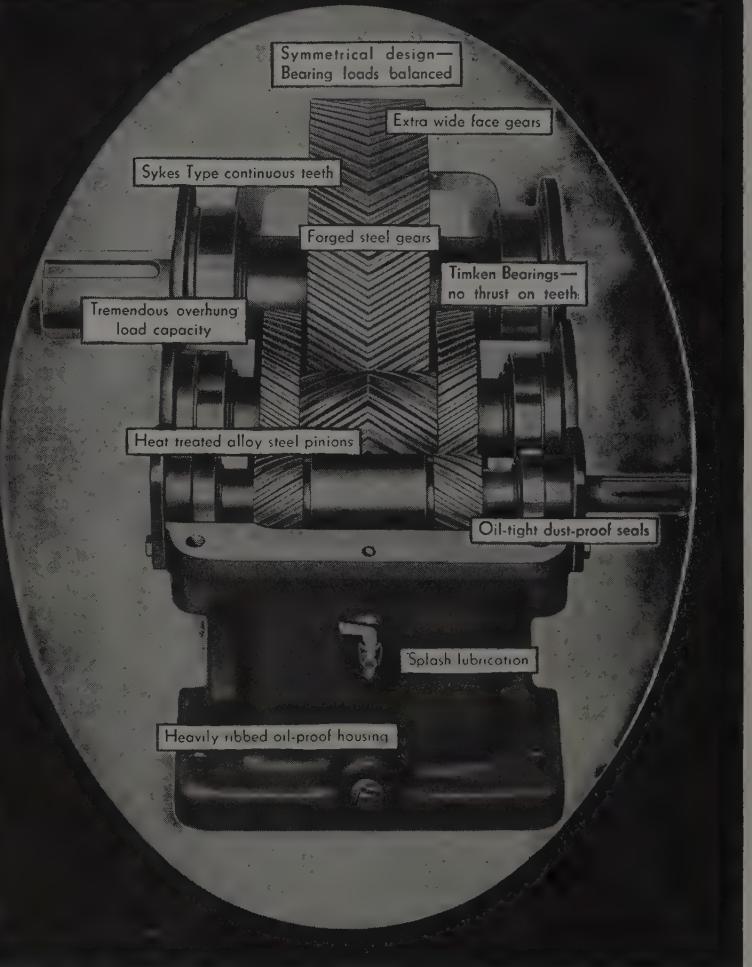
The size captions for weight and spacing extras on welded wire fabric have been combined under one bracket 6 inches and over; formerly the brackets were 6 to 18 inches, and over 12 inches.

Boston—Wood screw production continues to be restricted by lack of required grades in both wire and rods. Screw manufacturers are buying more finished wire, with their own drawing departments hampered by absence of rods.

The large variety of sizes and grades needed for small fastenings operates against a balanced inventory. Bessemer steel is especially short, but alloys for specialties are in ample supply. Round wire for flattening is also a tight item.

Chicago—Although demands for wire are in excess of supply, there are increasing evidences that buying pressure is easing. This is attributed partly to inventory balancing and curtailment and partly to resistance of buyers to pay the high prices for manufactured goods.

Birmingham—Demand for wire products apparently is endless. Except in remote instances and on irregular occasions, jobbers are not in position to meet requirements for such everyday items as nails and wire fencing. A little less complaining has been evident recently in the case of drawn wire, but observers say it indicates discouragement more than it does a general improvement in the overall picture.



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Structural Shapes . . .

Structural Shape Prices, Page 157

Boston—Inquiry for fabricated structural steel is slackening and some work continues to be postponed or reduced. Two textile mill additions, taking around 300 tons, are included. In estimating pending work difficulty is experienced in assembling a full range of subcontractors and suppliers to quote or estimate. A air tonnage has been placed, including bridges, awaiting federal aid authorization, and 525 tons for an addition to Judson Worcester Co. mill, Hudson, Mass. Electric Boat Co., Groton, Conn., has tentative contracts for bridges requiring 450 tons. Plain material deliveries are usually in late third quarter and demand for car building precludes much chance of improving shipping schedules. Holding up of export licenses opened up several thousand tons of rolling space which was quickly refilled.

New York—Shape demand continues potty. While there have been substantial construction awards since the beginning of this year in this district, many have been held up pending more stable conditions both with respect to labor and material. Incidentally, the building and construction trades of greater New York have just advised employers of their intention to seek a 10 per cent wage increase effective June 30.

Philadelphia—Some leading sellers of structural shapes expect to have their order books in fair balance by July 1, having blanked out certain periods in the current quarter in an effort to get caught up on commitments. In this effort they are being assisted somewhat by rather sluggish structural demand. However, most fabricating shops are still booked well ahead and should building costs begin to stabilize an improvement in structural activity should develop.

American Institute of Steel Construction reports an increase in March bookings of 23,534 tons, bringing the estimated total up to 147,706 tons as against revised totals of 124,172 and 104,095 for February and January, respectively. Estimated bookings for the first quarter of 5,973 tons represent an increase of 14.5 per cent over the average of 328,416 tons booked in the same period in the average five prewar years, 1936-1940. March shipments totaled 134,011 tons, against revised figures for February and March of 132,791 and 138,740 tons, respectively. Estimated total for the first quarter of 405,542 tons was 37 per cent greater than the average of 296,235 tons for the five prewar years.

Pittsburgh—The 10,000-car-per-month eight car assembly program will necessitate some re-juggling of projected production schedules on shapes, particularly among some of the smaller manufacturers. Structural fabricators have been able to take only slight headway against record order backlog in recent months despite the fact mill shipments have been relatively good since the first of the year. Present high construction costs have forced a number of expansion programs to be shelved for the time being, but in spite of this situation present mill output of structural shapes is falling well below rated requirements.

Birmingham—Even though there are a fair number of jobs scheduled, lagging inquiry is still evident in the structural steel market. A few major jobs are

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A-1609	13,835	Good	15,000
92279	18,089	Good	20,000
86619	26,700	Good	30,000
A-1607	12,351	Good	15,000
A-1608	12,977	Small hole	13,200

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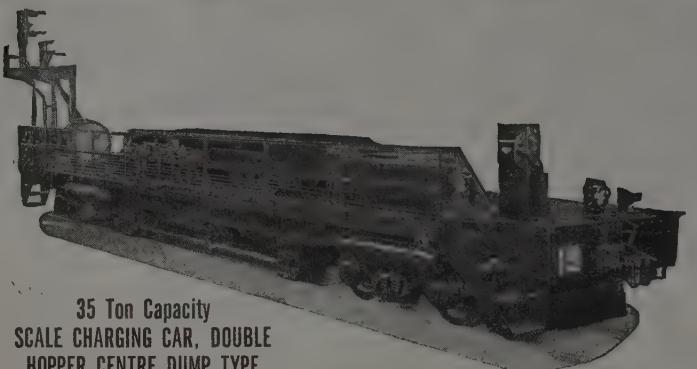
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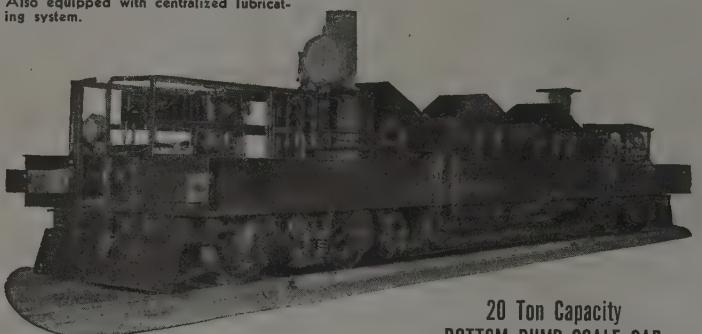
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scheduled, but most are of moderate size due mainly to either high or uncertain costs. Quite a few large ventures are in the prospective stage. Many will never materialize.

Seattle—Lack of materials is handicapping fabricating plant operations and no relief is expected until third quarter. Allocations are below requirements and in many instances deliveries are behind schedule. For these reasons, fabricators are cautious in accepting new business, confining orders to amount of stock in inventory and what is enroute.

Tubular Goods . . .

Tubular Goods Prices, Page 157

Boston—Utilities are seeking steel pipe with indications that all requirements can not be met this year. While pipe quotas to distributors are being met and are in excess of prewar levels, inventories are unbalanced and depleted. Integrated producers' supply of electric welded tubing is improving, but industrial users, depending on strip for forming from outside sources, are handicapped and are consequently buying more tubing than would normally be the case if strip were available. Alloy tubing is plentiful and producers of antifriction bearings have sufficient supplies of this material. This group is among the heaviest users of alloy tubing in southern New England. Pipe fabricators appear to be over-committed on the basis of current allocations and are pressing mills for additional tonnage.

New York—Distributors of merchant pipe are still moving tonnage out just about as fast as it is being received from the mills. This is particularly true of butt weld pipe, although not so true of lap weld. Despite the fact that new building construction is not going ahead as rapidly as many believed early in the year would be the case, there appears to be demand for repairs and small alterations of sufficient volume to consume all the pipe the mills can supply. Utility companies are buying heavily and are contracting with the mills direct for months ahead.

Pittsburgh—The most pressing demand for pipe is noted in the larger size classifications, which are produced by comparatively few mills. In most instances producers are booked into 1949 for oil and natural gas pipe line requirements. Heavy demand also is noted for stainless steel tubing, particularly the smaller size ranges. Sellers of seamless and electric weld carbon steel tubing note more conservative buying policy on the part of customers, who are carefully watching inventory position.

Jones & Laughlin Steel Corp. is erecting an addition to its strip storage building in order to have on hand ample supplies of raw material to assure continuous operation of its electric weld tube plant in Oil City, Pa.

Cleveland—No let up in demand for tubular goods is noted here. One of the largest sellers in this district is booked solidly through 1947 on standard pipe and through 1948 on line pipe. Quotas to jobbers show little change from month to month and are far below the amount requested.

Seattle—Inquiry for cast iron pipe has declined due mainly to uncertain and deferred deliveries. Potential demand in this area is of large proportions but many sizable projects have been delayed due to current market conditions.

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Pig Iron . . .

Demand continues heavy with supply inadequate to meet record peacetime needs

Pig Iron Prices, Page 158

New York—Pressure for pig iron in this district is greater this month than last, notwithstanding a somewhat easier flow of scrap and a high rate of pig iron output. This is ascribed to a better flow of coke, although there are some foundries who assert that they can see little difference.

However, with pig iron production at a high rate and scrap moving more freely, it would seem as if these factors should take themselves felt before very long. It would not prove surprising to some in the trade if next month would see an all-time high in pig iron production, and so far as the east specifically is concerned, the early blowing in of the large 10-ton furnace at Bethlehem, Pa., would prove to be a material help. In the quarters it is thought that this furnace might get back into operation by May 1, after having been down since the latter part of February. On the other hand, a Buffalo furnace engaged in the production of silvery iron was recently ordered to suspend for an indefinite period. The Daingerfield, Tex., blast furnace, now operated by the Lone Star Steel Co., will be in production by late June or early July, according to latest reliable reports. Tonnage is being booked for shipment into the north at \$45 base furnace plus freight. At present, class rates in this territory range from \$17 to possibly \$18 and higher depending upon point of destination. However, it is possible that by the time shipments can be made commodity rates will be in effect. These latter rates are somewhat lower. Foundry iron will be produced comparably to northern iron analysis. Debevoise & Pearson Co. Inc., 55 Liberty Street, New York City, will be agents for the Lone Star Co., it is understood.

Boston—More foundry subcontracting is taking place and some shops have opened certain lines of pressure castings because of costs among others. There has been only a slight increase in melt, however. Production of Everett, Mass., furnace is being evenly distributed, but consumers are unable to build up inventories to the desired point as this output is spread thinly. Expect for an improvement in tonnage from Buffalo and other outside points the improvement may be slight. At present, melters of iron, with the one exception of the American Steel & Wire Co., Worcester, are the worst off. Users of castings complain of price and quality.

Philadelphia—Although still scarce, pig iron supply is a shade easier, with the market brightened by prospects of further production. Scrap prices continue to drop and should the market for heavy melting steel sink much below \$30, delivered, certain iron producers with steel mill affiliations will start diverting more tonnage to the merchant trade, as their mills will take the value of replacement scrap with relatively favorable ranges once more. However, as foundry consumers find pig iron and scrap in slightly easier supply, they now are confronted with a sharp reduction in by-product coke by the

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leading district producer, who is starting on a program of major repairs. Foundry customers of this producer will experience a cut of about 30 per cent over the remainder of 1947.

Buffalo—Even though the pig iron market remains tight, producers were encouraged last week as the navigation season opened with the arrival of urgently needed ore from Duluth. The ore was consigned to the Bethlehem Lackawanna plant which had been bringing in ore by rail to reimburse vanishing reserve stocks. Overall ore stockpiles have reached the lowest point on record. Limestone shipments are sorely needed also. Further increases in supplies of scrap continue to lend support to a predicted increase in supply of foundry iron in the near future. However, at the present

time demand far exceeds output. Producers continue to restrict the movement of iron into other districts which usually depend on this area.

Pittsburgh—Despite resumption of normal pig iron operating schedules in this district, supply is inadequate to meet record peacetime requirements. Indicative of this situation is the fact that the lone merchant producer here is able to meet but 60 per cent of the monthly requirements. Considerable tonnage of merchant iron normally comes in to this district from Cleveland, Erie, and other points, but this practice has been largely discontinued because of the unusually heavy requirements for steelmaking operations accentuated by the relative scarcity of open-hearth scrap.

Cincinnati—Shipments of pig iron, both

northern and southern, are improved although allotments are no heavier. Tonnage for the month is expected to maintain foundry operations close to previous levels. Supplies of by-product foundry coke are tight because of the recent coal mine shutdowns and because of a strike at Indianapolis ovens.

Birmingham—Birmingham blast furnace interests are complaining of restrictive freight rates but are unable to even approximately meet the need for iron in their immediate territory. With an eye to the future, however, they declare the Jan. 1 increase will limit their sales territory, making problematical some areas in which they have depended in the past. Iron requirements in this territory are far and away beyond supplies.

Scrap and Pig Iron Stocks Show Increase in February

Stocks of iron and steel scrap at consumers' plant at the end of February were estimated by the Bureau of Mines, United States Department of the Interior, at 2,707,000 gross tons, compared to 2,577,000 gross tons on Jan. 31, an increase of 5 per cent. Scrap in the hands of dealers, however, declined during the month from 247,560 tons to 215,623 tons, a decrease of 13 per cent.

Stocks of pig iron in February increased to 656,000 gross tons from the January 31 total of 602,000 gross tons, an increase of 9 per cent.

The total melt of ferrous scrap and pig iron declined 10 per cent in February, but amounted to 8,008,000 tons, which is at the same average daily consumption rate as in January. Pig iron consumption decreased 11 per cent while scrap use dropped 8 per cent.

Canada . . .

Toronto, Ont.—Primary shapes produced by Canadian steel mills in January totaled 267,511 net tons, of which 258,060 tons were carbon steel and 9,451 tons were alloy steel. Shipments in the month amounted to 268,313 net tons, including 261,114 tons of carbon steel and 7,199 tons of alloy steel. For January, 1946, production of primary shapes totaled 246,743 net tons, while shipments amounted to 243,245 tons.

Shipments of primary steel shapes during January included 50,492 tons of semifinished shapes; 15,618 tons of structural; 18,163 tons of plates; 20,029 tons of rails; 54,505 tons of bars; 12,406 tons of pipe and tubes; 24,220 tons of wire rods; 21,903 tons of black sheets; 6,342 tons of galvanized sheets; 559 tons of tool steel; 6,026 tons of castings and 38,055 tons of other shapes.

Of the January shipments, 26,085 tons went directly to the railways and railway car shops; 11,171 tons to pressing, forming and stamping plants; 24,441 tons to merchant trade products; 29,360 tons to building construction; 14,683 tons to the container industry; 8320 tons to agricultural equipment; 9803 tons to the automotive industry; 14,279 tons to machinery plants; 5508 tons to shipbuilding; 7127 tons to mining, lumbering, etc., and 2320 tons to miscellaneous industries. Wholesale and warehousing accounted for 29,503 tons; producers interchange for 56,051 tons and exports for 30,157 tons.



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Scrap . . .

Heavy melting eases about \$3 a ton in most districts and may drop further

Scrap Prices, Page 162

Pittsburgh — Market price level of \$32.50 for heavy melting steel and \$30 for short shoveling turnings was established last week by mill purchases. This represents a drop of \$5.50 per ton for local heavy melting steel since the mills withdrew from the market about a month ago. In contrast with peak prices paid for remote material, ranging between \$44 and \$46, the present price level represents a sharp reduction. Even at the \$32.50 price there has been only one major purchase, and it is reported one mill has refused tonnage at this price level. There is good prospect the market will be stabilized at still lower levels now that the steel strike threat is no longer a factor, based on the apparent mill policy not to enter the market on a large scale at the \$32.50 level, while it was rumored late last week that one large interest was seeking to buy heavy melting steel for less.

Some weakness also has developed in prices for cast iron scrap grades. Price range for No. 1 cupola is now about \$42 to \$42.50 and malleable at \$45.50 to \$46. In absence of recent awards, railroad scrap continues nominal at former high prices.

New York — While there is little important buying, with most orders confined to small spot transactions, the brokers' buying market here continues to move downward. The market is quoted 25 to \$27 for No. 1 and No. 2 heavy melting steel and for busheling and No. 1 and 2 bundles. Machine shop turnings and mixed borings and turnings are off around \$18 to \$19 and short shoveling turnings to \$21, fob shipping point. Punchings and plate scrap and cut structural are holding nominally at \$27 to \$28 and electric furnace bundles, \$26. No. 1 chemical borings hold at \$24.

Cast grades continue weak, with the exception of malleable, which is unchanged at \$48 to \$49. No. 1 cupola cast is quoted \$40 to \$42; charging box cast, \$40; unstripped motor blocks, \$7.50 to \$8.8, a rather appreciable drop in this latter material over the past few days.

The situation generally is highly unsettled with still lower prices apparently in prospect.

Boston—Cast grades of scrap have weakened after resisting the reaction in open-hearth grades which are sharply lower. Cast grades first broke \$3 or more a ton. Movement of heavy melting and other steelmaking grades is heavier, dealers fearing a further decline. Consumers of cast scrap also are better supplied. Heavy melting steel late last week is quoted \$24 to \$25; short shoveling turnings, \$18 to \$19; No. 1 cupola cast 8 to \$40.

Philadelphia—Scrap prices show further weakness, with practically all grades, except chemical borings and malleable, undergoing a decline. Prices on major cast grades, as well as on melting steel, have dropped rather sharply and weakness in low phosphorus is especially pronounced. Melting steel, as well as most other grades, is moving freely as shipments are being rushed against high-priced con-

tracts which expire by May 1 in most instances. Following that date, the movement is expected to slow up as new consumer contracts are being made at substantially lower prices, thus providing collectors with less incentive. So far there has not been much new contracting, although as the new month approaches buying should expand. The market here is quoted as follows: No. 1 heavy melting steel, \$30 to \$31; No. 2 heavy melting and No. 1 busheling, \$29 to \$30; No. 1 bundles, \$30 to \$31; No. 2 bundles, \$27 to \$28; No. 3 bundles, \$26; machine shop turnings, \$23 to \$24; mixed borings and turnings, \$21 to \$22; short shoveling turnings, \$24 to \$24.50; bar crops, punchings and plate scrap, \$34 to \$35; electric furnace bundles, \$31 to

\$32; cut structural, \$34 to \$35; heavy turnings, \$30 to \$31; No. 1 cupola cast, \$45 to \$46; charging box cast and heavy breakable cast, \$40 to \$42; unstripped motor blocks, \$42 to \$42.50; clean auto cast \$45 to \$46; No. 1 wheels, \$46 to \$46.50.

Buffalo—With an extension in the recent drastic price plunge, fresh buying interest was shown in the scrap market during the week. One of the leading mills, who had been hanging on the sidelines, re-entered the market to purchase heavy melting material and bundles at \$30.50 to \$31.50 a ton, a drop of \$2.50 to \$3.50 from the previous sale. Even at the reduced range the market continued to act decidedly weak, with further buying inquiries hard to find. Turn-

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tings were pared an additional 50 cents with machine shop offerings changing hands at \$22.50 to \$23.50 while short shoveling material was bringing \$24.50 to \$25.50. Weaker tendencies also spread through the cast market, but price recessions were not as sharp as those in steelmaking grades. The range on No. 1 cupola was cut \$2 to \$3 to a range of \$40 to \$42.

Cleveland — Scrap prices were definitely lower here last week, although no sales were recorded to establish a firm market. Nominal quotations of \$31.50 for heavy melting steel, \$26 for machine shop turnings, \$27 to \$28 for short shovel turnings, and \$45 for No. 1 cupola cast indicated a drop of about \$3 a ton. Foundry grades remained scarce and prices held close to recent highs. Columbia Iron & Metal Co. was the successful bidder on 6500 tons of debandaged shell steel at the Ravenna, O., arsenal on bids ranging from \$37.50 to \$39.25 a ton, fob Ravenna, compared with a high bid of \$39.55 for similar material two weeks earlier. Railroad scrap is expected to drop about \$5 on the May offerings. Scrap is flooding most consumers' plants here with large tonnages in yards, on sidings and en route, although this is true only of consumers who bought heavily at the recent highs. Steel mills in this district now have about a 30-days' supply.

Chicago — Open-hearth scrap was purchased here last week at \$31 plus 50 cents commission, delivered consumer, this figure being a \$2 drop from the price which mills previously had offered.

Low volume of buying by mills plus a settling down in eastern markets were held responsible. Majority of steelmakers in this district are out of the market currently and are not expected to resume buying until May 1 or after. Consumers have improved their inventories in recent weeks through receipt of old orders placed at the \$36 figure, but shipments against these soon will be completed.

Cincinnati — Quotations on scrap are lower, although choice grades of cast scrap are bucking the trend. New buying, except for spot shipments, has declined and a further sign of weakness is seen in the considerable order cancellations. Some interests believe that renewed buying, to reappear soon, will uncover a basic shortage of tonnage needed at the current rate of melt. They predict prices will move higher, but not to recent peaks. Although their stocks are fair, foundries continue an active market in offsetting inadequate pig iron shipments.

St. Louis — Scrap shipments continue to improve, but the market is relatively inactive pending price developments when mills place orders May 1. Mills for the first time in many months have reached or exceeded 45-day scrap inventories. Most withdrew from the market at that point, preferring not to stock heavily in a declining price picture. Heavy melting steel in this district declined \$4 in three weeks, and further weakening is expected next month. Foundries also are out of the market for most items.

Birmingham — Scrap price trend was predominantly downward here last week with some purchases of heavy melting steel reported at \$30 per ton compared with a recent high of \$36. Considerable new offerings were in evidence but buyers were awaiting developments in a highly uncertain market. Lower prices were quoted on heavy melting steel grades at \$29 to \$30; bar crops, \$32 to \$33; No. 1 cast, \$37 to \$39; stove plate, \$35 to \$36; scrap rails, \$30 to \$31; angles and splice bars, \$32 to \$33; rails cut three feet and under, \$32 to \$33; and cast iron car wheels, \$32 to \$32.50.

Seattle — Scrap supply continues to improve here. Country dealers are shipping in greater volume, taking advantage of the present high level of \$20 per gross ton, fob mill, Seattle, and also taking notice of price reaction in the East. Other scrap sources are also forwarding tonnage. The World War I-built freighter MORNACRIO is being scrapped here by the Puget Sound Bridge & Dredging Co., the resulting 3000 tons of scrap being consigned to Bethlehem Pacific Coast Steel Co.'s Seattle plant. Other obsolete ships are scheduled for early breaking up here.

Plan Tour To Assess Cost Of Reclaiming Navy Scrap

Tour of several Pacific island scrap storage dumps will be made in the near future by two scrap experts to determine the economic angles involved in returning the scrap to the United States. Arrangements for the tour, which will be conducted by the Navy, have been made by Robert W. Wolcott, chairman, American Iron & Steel Institute Scrap Committee, and W. John Kenney, assistant secretary of the Navy. The scrap experts are L. G. Knight, Bethlehem Pacific Coast Steel Corp., Seattle, and Leonard C. Abrams, Atlas Steel & Supply Co., Cleveland. Principal stops will be Manus, Guam, Samar, and possibly Okinawa, where the greatest portions of scrap are stored.

Because under present arrangements money obtained from sale of Navy scrap must be turned over to the Treasury, the Navy is unwilling to go to any expense to collect the scrap, but is willing to sell it where is and as is. If cost of returning the scrap to this country is determined to be prohibitive, the Scrap Committee will ask Congress to give the Navy a special appropriation on the ground the material is urgently needed.

Refractories . . .

Refractories Prices, Page 158

Pittsburgh — Exceptional heavy demand makes it impossible to make much headway against order backlogs, which range from six to eight months on special shapes, such as silica coke oven brick. However, some standard items are available within two months. Extensive relining programs for much overworked blast furnaces, open hearths and coke ovens are expected to substantially augment overall demand for months ahead. Coke oven expansion programs now under consideration also are expected to require sizable additional tonnage later this year. Producers state easing in freight car shortage has made possible substantial improvement in shipments recently.



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Varehouse . . .

Warehouse Prices, Page 159

Boston—Inventories differ with distributors, depending on products. Those specializing in alloys, stainless and tool steels are well stocked and report moderate volume of business. General line distributors have low stocks of products most in demand, including flat-rolled, structural, plates, small bars and wire products. Sales volume is therefore retarded lack of stocks in these items with indications there will be slight improvement wanted tonnage this quarter. A leading jobber, based on firm orders with mills, estimates hardly more than one-third of the expected volume will be forthcoming in critical products.

Pittsburgh — Steel distributors report little change in volume of mill shipments past few weeks. At least one interstate states its overall stock position has been reduced slightly this month. Inventories generally are unbalanced, as indicated by report of one warehouse interest that structural shape sizes now in stock represent but 30 per cent of the total number of size ranges carried. With continued mill operations apparently assured, warehouse interests are hopeful for some improvement in mill shipments. Alloy and stainless steel items are in good supply from warehouse sources. One warehouse interest, ordering bars to 10 per cent random lengths some weeks now to avoid the mill quota, reports percentage of odd sizes shipped by mills to date has averaged well below this percentage. As long as present tight supply situation prevails, interest does not anticipate much difficulty in getting rid of the odd sizes.

Cleveland—Supply of the critically short products—sheets, plates, structural shapes and small bars—continues to lag behind demands of warehouse customers. Demand for some cold-finished products, however, shows signs of declining as supplies increase somewhat. Spottiness is noted in demand and periodic buying is often followed by revived interest. Warehousemen are watching inventories carefully to avoid, insofar as possible, buying of the more plentiful products beyond actual demand. One dealer reports his last month's shipments were the best ever recorded and this month may match or beat that record.

Los Angeles — Warehouse sales increased slightly here last week. The rise was viewed optimistically because steel fabricators are not buying more than actually needed and there are purchase programs directed at inventory build-up only. The chronic shortage, in sheets, alloy bars and galvanized ones still obtains.

on Ore . . .

Iron Ore Prices, Page 158

Cleveland — Consumption of Lake Superior iron ore increased in March to 6,9204 tons from 6,264,284 in February, according to the Lake Superior Iron Ore Association. This brought total consumption for the first quarter to 20,344 tons compared with only 11,445 tons in the like 1946 period when blast furnace operations were curtailed due to the steel strike.

As of Apr. 1, 167 furnaces in the United States and 7 in Canada were in blast, leaving only 16 idle in this country and 3 in Canada. A month ago 176

furnaces were in blast and 17 were idle while a year ago these figures were 160 and 35, respectively.

Total stocks of Lake Superior ore on Lake Erie docks and at furnaces amounted to only 17,411,010 tons on Apr. 1, compared with 24,316,980 tons a month ago and 27,601,106 a year ago. Of the Apr. 1 total, 14,165,665 tons were at furnaces in this country, 589,420 at Canadian furnaces, and 2,655,925 tons on Lake Erie docks.

Ore interests hope to move 85 million tons from the head of the lakes in the 1947 season. This would be the second largest movement on record, being exceeded only by the 92,076,781 tons shipped in the 1942 season.

The ore shipping season is in full

swing, following the rapid movement of ice out of Whitefish Bay early last week. The opening was at about the average date for most ports, but the latest in 11 years at Buffalo where the first sailings were delayed until Apr. 21.

Rails, Cars . . .

Track Material Prices, Page 157

New York — While various scattered awards are being reported, freight car buying so far this month has been down from the corresponding period in March and as there are few outstanding lists still pending, it would not prove surprising if April as a whole would show a decline from the preceding month.

The Brosius Tongs Charger shown in the above illustration, handles ingots and serves a heating furnace and mill. Instead of using the usual tongs, the machine is provided with a sliding jaw so that the ingot may be picked up lengthwise, thus permitting the ingots to be placed closer together in the furnace. The machine is traveled over the floor by means of an electric motor, while all other motions, including steering, are accomplished through oil cylinders actuated through a machine mounted, motor driven oil pump.

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SHARPSBURG, Pittsburgh (15) PENNSYLVANIA

Chesapeake & Ohio railroad has awarded 3000 all-welded hopper cars to American Car & Foundry Co., New York. The contract is said to be the largest ever placed for hopper cars of welded construction.

Meanwhile, car builders are stepping up their production gradually as more steel and other materials are being received. Their great difficulty at present is in establishing a balanced inventory. In some products supplies are adequate and in others they are still scarce. Shortage of castings is being complained about in particular. It appears that it will be late in this quarter or early next before they can get their output up finally to 10,000 cars per month, the goal now being sought.

Bolts, Nuts . . .

Bolt, Nut, Rivet Prices, Page 157

New York—Bolt and nut order backlogs are at an all-time peak, even higher than during the war. On the $\frac{1}{2}$ by 6 inches and smaller, most makers are booked up for the remainder of the year. Demand for small fasteners is not only heavy domestic-wise but, export-wise as well, with a heavier demand abroad for these smaller items then for the structural items. Most foreign demand at present is from Europe and the Far East.

Meanwhile, bolt and nut makers continue to have difficulty obtaining steel. Some makers claim they can see no improvement in the smaller more popular sizes of bars and rods and assert they could step up their operations materially if an adequate supply were available.

Holds Soil Pipe Takes 8% Of Foundry, Malleable Iron

Merchant pig iron producers last week took issue with certain recent statements by the Office of the Housing Expediter concerning pig iron output. According to the Committee on Merchant Pig Iron of the American Iron & Steel Institute the housing program continues to receive just as large a percentage of total production of foundry and malleable pig iron as it was receiving under the government's certification program before Apr. 1.

The housing expediter's statement implied that less than 1 per cent of total pig iron production is going for housing, whereas previously the government agency had based its percentages on the total of foundry and malleable pig iron production.

"On the basis of this release and estimating April production of 450,000 tons of foundry and malleable grades of pig iron, the certification of 36,300 tons for soil pipe actually represents over 8 per cent of the available foundry and malleable production," said the merchant iron producers.

"Actually the tonnage of pig iron certified for soil pipe in April was only slightly lower than the certification for March. Because of the effect of coal shortages,

the April certification of soil pipe probably will be as high as 10 per cent of the available production of foundry and malleable pig iron."

The merchant pig iron producers also called attention to the fact that although certifications are now being made only for soil pipe, the housing expediter has indicated he still expects pig iron producers to see that the balance of the housing program, including heating and plumbing equipment, pressure pipe, radiation and other housing items, is adequately supplied.

The impact of the housing program remains unchanged from what it was when pig iron for all housing items was certified prior to Apr. 1, the merchant pig iron producers said. Certain producers of housing items are pressing for even larger tonnages.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

2145 tons, steel sheet piling, Holyoke, Mass., dike, south end and Springfield section of Connecticut river, U. S. engineer project, Boston, to Bethlehem Steel Co., Bethlehem, Pa., through Daniel O'Connell's Sons Co., Holyoke, Mass.

1650 tons, extension to Twin Branch plant, Indiana & Michigan Electric Co., Mishawaka, Ind., to American Bridge Co., Pittsburgh.

1070 tons, continuous beam bridge over Pennsylvania Railroad, Dolton, Ill., for Cook County, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; Thomas McQueen Co., Forest Park, Ill., contractor; bids Mar. 19.

1000 tons, chipper and barker plant, St. Regis Paper Co., Tacoma, Wash., to Isaacson Iron Works, Seattle. (Previously reported as 1000 tons).

860 tons, public school No. 26, Queens, New York, through John Kennedy & Co., Harris Structural Steel Co., New York.

620 tons, Calumet Parkway grade separation for Cook County, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; Thomas McQueen Co., Forest Park, Ill., contractor; bids Mar. 19.

400 tons, office and manufacturing building, National Lock Co., Rockford, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.; Security Building Co., Rockford, Ill., contractor; bids Apr. 14.

350 tons, approach to Connecticut river bridge, Old Lyme, Conn., to Electric Boat Co., Groton, Conn., through Campenella & Card, Providence, R. I., general contractors.

335 tons, addition to Adam Scheidt brewery, Norristown, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

240 tons, Burnham Ave. grade separation, for Cook County, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; Thomas McQueen Co., Forest Park, Ill., contractor; bids Mar. 19.

235 tons, factory building, Continental Paper Co., Richfield, N. J., to Selbach-Meyer Co., New York.

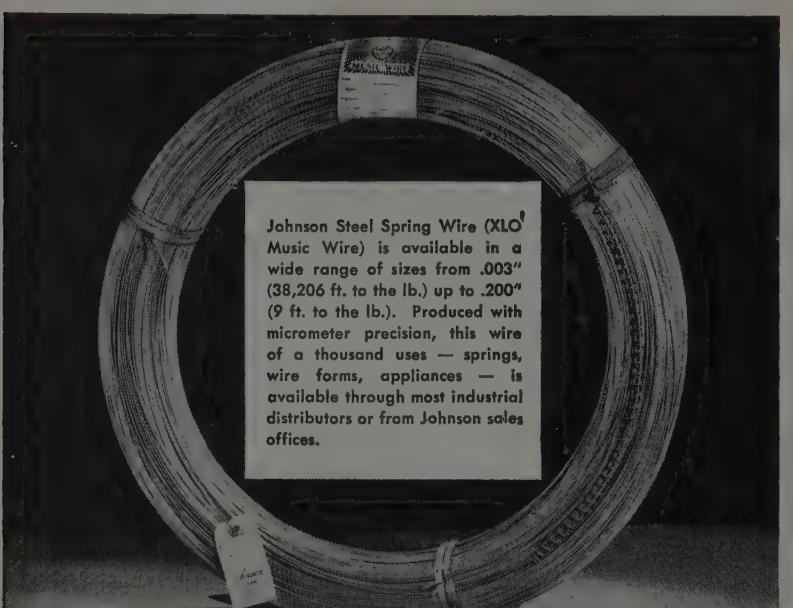
200 tons, chipper plant, pulp mill at Port Townsend, Wash., to Pacific Car & Foundry Co., Seattle.

150 tons, sheet piling, unit No. 18, Fisk S station, Commonwealth Edison Co., Chicago, to Carnegie-Illinois Steel Corp., Chicago; Paschen Contractors Inc., Chicago, contractor.

150 tons, state bridge, Rensselaer, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

140 tons, addition, Heintz Mfg. Co., Philadelphia, to Bethlehem Fabricators Inc., Bethlehem, Pa.

115 tons, addition, Providence Journal building, Providence, R. I., through James Stewart & Co., New York, to Bethlehem Steel Co., Bethlehem, Pa.



JOHNSON

STEEL AND WIRE COMPANY, INC.

WORCESTER 1, MASS.

NEW YORK

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DETROIT

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LOS ANGELES

TORONTO

15 tons, New York Central Railroad bridge, Fonda, N. Y., to Pittsburgh Des Moines Steel Co., Pittsburgh.

10 tons, state bridge, Elmhurst, Lackawanna county, Pennsylvania, to American Bridge Co., Pittsburgh.

STRUCTURAL STEEL PENDING

100 tons, truck terminal, Port of New York Authority, lower Manhattan, New York, American Bridge Co., low bidder.

10 tons, five bridges, Puyallup river, near Tacoma, Wash.; bids to U. S. engineer, Seattle, April 30.

10 tons, superstructure, E. 130th St. bridge over Calumet river, Department of Public Works, Chicago; bids May 16.

5 tons, chemistry and chemical engineering building, University of Illinois, Urbana, Ill.; Bethlehem Steel Co., Bethlehem, Pa., low; bids Apr. 15.

10 tons, field house, Omaha, Neb.; bids Apr. 30.

10 tons, sheet piling, Fall river channel improvement, Hot Springs, S. Dak.; bids May 15.

10 tons, store expansion, Carson, Pirie, Scott & Co., Chicago; bids May 5.

10 tons, bridge 5718, Kettle River, Minn., for state; bids Apr. 18.

10 tons, engine house, Pennsylvania railroad, Enola, Pa.

5 tons, warehouse extension, Electro-Motive Division, General Motors Corp., LaGrange, Ill.; bids Apr. 21.

10 tons, boiler house extension, Interlake Iron Corp., South Chicago, Ill.; Freyn Engineering Co., Chicago, engineer.

stated, state highway bridge, Wahkiakum county, Washington; General Construction Co., Seattle, low \$109,103, general contractor.

stated, 120-foot bridge, Whatcom county, Washington; awarded to Terpening & Sons, Ferndale, Wash.

REINFORCING BARS . . .

REINFORCING BARS PLACED

5 tons, spillway and outlet structure, Davis Dam and power plant in Arizona, Bureau of Reclamation, Denver, to Sheffield Steel Corp., Kansas City, Mo.; low \$93,242.

10 tons, Unit No. 18, Fish St. station, Commonwealth Edison Co., Chicago, to Ceco Steel Products Co., Chicago; Paschen Contractors Inc., Chicago, contractor.

5 tons, addition, Lake Shore Rubber Co., Des Moines, Iowa, to Des Moines Steel Co., Des Moines.

5 tons, Tacoma viaduct, to Bethlehem Pacific Coast Steel Co., Seattle; Anderson Bridge Co., Tacoma, Wash., general contractor.

5 tons, building, W. F. Schrafft & Sons Corp., Boston, to Truscon Steel Co., Youngstown, O., through John Bowen Co., Boston, contractor.

5 tons, telephone building, Newton, Mass., Truscon Steel Co., Youngstown, O., through John Bowen Co., Boston, general contractor.

REINFORCING BARS PENDING

10 tons, Holyoke, Mass., dike; 2145 tons of steel sheet piling for this project went to Bethlehem Steel Co., Bethlehem, Pa.

5 tons, University of Washington library addition; bids early May.

5 tons, substructure east bridge, Fourteenth St. bridges, U. S. route 1, Potomac River, Washington, bids May 15 to district commissioners; also, 110,000 linear feet of steel bearing piles.

5 tons, sewage plant, Marshfield, Wis., for city; bids Apr. 17.

5 tons, highway bridge, Monticello, Ind., for State Highway Commission; bids of Apr. 15 over estimate, rejected.

5 tons, factory building, Furst-McNess Co., report, Ill.; bids Apr. 21.

5 tons, Bureau of Reclamation headquarters, Phratia, Wash.; general contract awarded.



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HOMESTEAD - PENNSYLVANIA

160 tons, Seattle warehouse; general bids in.
180 tons, including 60 tons of shapes, state highway projects, Umatilla county, Oregon; bids to Portland April 24.
120 tons, Elks' Temple, Bremerton, Wash.; general bids in.
Unstated, two overhead viaducts, Oregon state highway projects; general contract to Porter W. Yett, Portland, Oreg.
Unstated, 1800-foot reinforced concrete lined tunnel, Oregon state hospital; bids soon.
Unstated, steel girder bridge, King county, Washington; bids to Olympia, May 6.

PLATES . . .**PLATES PLACED**

1700 tons, tanks, Buckley Bros., Bridgeport, Conn., to Bethlehem Steel Co., Bethlehem, Pa.
1500 tons, 21 tanks, Texas City, Tex., for Carbon & Carbide Chemical Co., New York, to Chicago Bridge & Iron Works, Chicago.
1150 tons, storage tanks, Western Oil & Fuel Co., to Bethlehem Steel Co., Bethlehem, Pa.

PIPE . . .**STEEL PIPE PLACED**

Unstated, steel pontoon pipe, thirty-two 50-foot lengths, 24-inch ID, and two 40-foot lengths, same diameter, U. S. engineer, Savannah, Ga., to Lancaster Iron Works, Lancaster, Pa., \$23,154.

CAST IRON PIPE PENDING

1000 tons plus, Portland, Oreg., water department, bids April 29.

100 tons plus, for Astoria, Oreg.; bids rejected on account of 21-month delivery clause; James O. Conville, city manager, will seek materials in open market.

RAILS, CARS . . .**RAILROAD CARS PLACED**

Chesapeake & Ohio, 3000 seventy-ton all-steel hopper cars, to American Car & Foundry Co., New York, for erection at Huntington, Va., shops.

Chicago & Northwestern, 1000 fifty-ton box cars, to American Car & Foundry Co., New York.

Chicago, St. Paul, Minneapolis & Omaha, 400 fifty-ton box cars, to American Car & Foundry Co., New York.

Detroit & Mackinac, 25 fifty-ton hopper cars and 10 seventy-ton hopper cars, to General American Transportation Co., Chicago.

Kansas City Southern, 400 fifty-ton box cars, to the Pullman-Standard Car Mfg. Co., Chicago.

Northern Pacific, 1000 fifty-ton box cars, to its Brainerd, Minn., shops.

Southern, 150 seventy-ton covered hopper cars, to Pullman-Standard Car Mfg. Co., Chicago, for erection at Butler, Pa.

Wabash, 300 fifty-ton box cars, to its Decatur, Ill., shops.

RAILROAD CARS PENDING

Fruit Growers Express Co., 600 forty-ton refrigerator cars, contemplated for erection in its own shops; these are in addition to 500 recently noted as scheduled for construction in company shops.

New Jersey, Indiana & Illinois, a subsidiary of the Wabash, 100 fifty-ton automobile cars, bids asked.

New York Central, 2000 fifty-ton box cars.

Union Pacific, 400 seventy-ton covered hopper cars, pending.

RAILS PLACED

Reading, 1000 tons, to Bethlehem Steel Co., Bethlehem, Pa.

RAILS PENDING

Navy, ordnance, Earle, N. J., 317 tons rails, Bethlehem Steel Co., Bethlehem, Pa., low, fcb Lackawanna plant, Sept. 1.

**CONSTRUCTION
AND ENTERPRISE****MARYLAND**

BALTIMORE—Anchor Post Products Inc., 6400 Eastern Ave., is contemplating erecting a plant for weaving wire fence at Houston Tex.

BALTIMORE—Baltimore Forge Co., 232 Keighley Highway, has been organized by V. I. Ohms to produce a general line of forgings with emphasis on drop forgings. Company has acquired the former plant of Patapsco Forge Co. Inc.

BALTIMORE—Ceco Steel Products Corp., Chicago, plans a factory and warehouse here at Caton Ave. and Strickland St. Factory will be a 35,000 sq ft, 1-story building to be used to fabricate reinforcing steel and steel and wire mesh. E. T. Gustafson, 2011 K St. N.W. Washington, is in charge of operations.

TOWSON, MD.—Murray Corp. has awarded a contract for a 1-story building to house the packing and shipping department.

MICHIGAN

BASELINE, MICH.—Vernor Experimental Tool Co., 8281 E. Eight-Mile Rd., has been formed by F. E. Edlund with a capital of \$50,000 to manufacture tools, dies, jigs and fixtures.

CADILLAC, MICH.—Cadillac Brass & Aluminum Foundry Inc., Haynes St., has been formed by J. H. Lang with a capital of \$75,000 to manufacture and sell castings and foundry products.

GALIEN, MICH.—Mathieu & Sons Foundry Co. has started construction on a grey iron foundry here to cost \$153,333.

DETROIT—Lafayette Steel Co. has received CPA approval for construction of a \$76,000 factory.

DETROIT—Lare & West Inc., 4400 Cass Ave. has been formed by Russell B. Dawson with a capital of \$50,000 for an auto parts manufacturing business.

DETROIT—Century Metal Moulding Co., 884 Lyndon, has been formed by Irwin Green with a capital of \$100,000 to manufacture and sell tools and machinery.

DETROIT—Engineering Products Corp., 338 Penobscot Bldg., has been formed by Otto T. Hasche with a capital of \$300,000 to manufacture and sell water and heating equipment.

DETROIT—Meldrum Tool & Mfg. Co. Inc., 5365 Rohrs Ave., has been formed by F. J. Noder with a capital of \$100,000 to manufacture dies, jigs, tools and gages.

DETROIT—Precision Spring Corp. has awarded a contract for \$69,400 to Rudy-Sackett Co. for a factory addition. Architect is E. T. Knopke.

DETROIT—Micromatic Hone Corp., 8100 Schoolcraft, is erecting a 35,000 sq ft addition to its present building which will house heavy machinery and job honing operations. Builder is Austin Co.

FLINT, MICH.—E. L. du Pont de Nemours & Co. has CPA approval for a \$100,000 remodeling project for its laboratory.

RIVER ROUGE, MICH.—Sun Oil Co., Philadelphia, is taking figures for construction of a bulk storage plant and boat dock on Dix Rd.

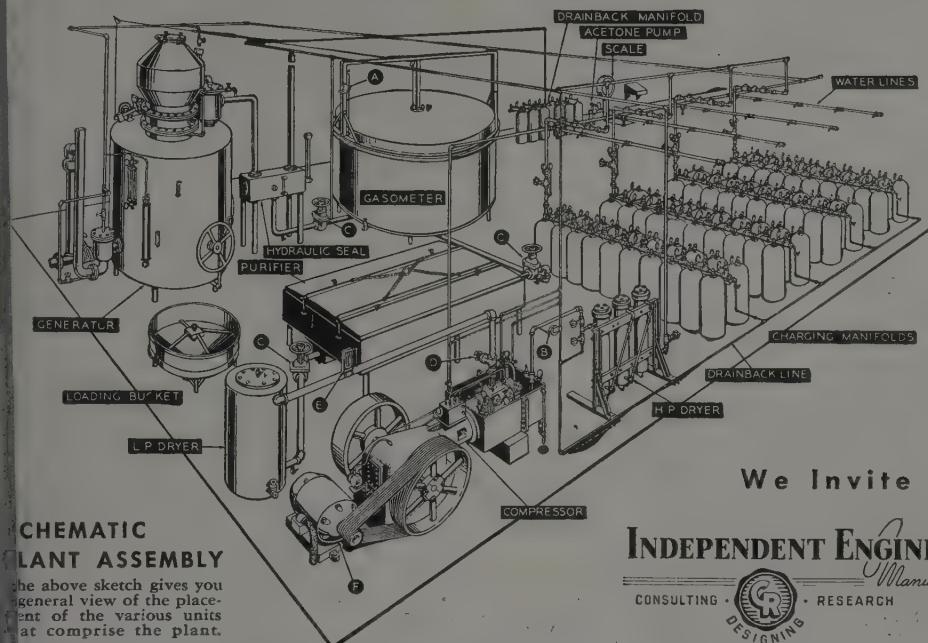
ROGERS CITY, MICH.—City is having plans completed by Shoecraft, Drury and McNamee, Ann Arbor, for a \$480,000 sewage system and sewage treatment plant.

SAULT STE. MARIE, MICH.—City has completed plans for construction of a \$280,000 sewage system.

ST. JOHNS, MICH.—Sealed Power Corp., Muskegon, is having plans prepared for the construction of a \$301,000 factory addition by Giffels & Vallet Inc. and L. Rosetti, Detroit, associated architects and engineers.

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NEW YORK

BUFFALO—H. L. & S. Machine Co., 49 Illinois St., has been formed by Henry Huston and Robert L. Lannen.

CONKLIN, N. Y.—Viking Tool & Mfg. Corp., has been incorporated by Hans A. Holmberg with a capital of \$100,000.

NEW YORK—Maguire Machinery Co. Inc., 330 W. 42nd St., has been organized to manufacture and sell dairy machinery and power conveyors by Walter Maguire.

SIDNEY, N. Y.—General Laboratory Associates Inc. has been formed by J. R. Frei and associates to engage in the manufacture of electrical devices.

SYRACUSE, N. Y.—Carpenter Northeast Motors Inc. has been formed by Fred C. Carpenter and associates for the manufacture of aircraft.

SYRACUSE, N. Y.—Niagara Hudson Power Corp. plans to spend more than \$100 million in the next five years for extension and improvement of its service throughout New York. Expenditure will be made for additions to power generating stations and transformers, for extension of rural electric lines, and for extensions to the company's steam stations in Buffalo and Oswego.

OHIO

AKRON—Goodyear Aircraft Corp. is installing special welding and sheet metal handling equipment.

AVON LAKE, O.—B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, has purchased 120 acres of land here in anticipation of expanding its \$600,000 plastic laboratory located on Walker and Moore Rds.

BEREA, O.—Ohio Rod Products Inc. has been formed by Edmund J. Domboske, 48 W. Bagley Rd., to manufacture bolts and rods. Firm is building a 1-story plant on Mills St.

CLEVELAND—Tinnerman Products, 2038

Fulton Rd., will build a \$59,000 addition to its plant at 8300 Brookpark Rd.

CLEVELAND—Yoder-Morris Inc., 5914 Merrill Ave., has been formed by Harvey Yoder to manufacture electric door operators formerly produced by Yoder Co.

CLEVELAND—Thompson Products Inc., 23555 Euclid Ave., has formed a new corporation, Thompson Vita-Meter Corp., which will be a distributor for a water-injection device.

GIRARD, O.—Girard Tank Welding Co. has been formed by Charles L. Radcliffe, 1103 Washington Ave., to fabricate fuel oil tanks for home heating systems.

WILLOUGHBY, O.—Lubrizol Corp., Lakeland Blvd., expects to complete its proposed \$100,000 building expansion project by summer's end. Largest single unit will be a 2-story structure 200 x 40 ft.

YOUNGSTOWN—Tee-Nee Trailer Co., 111 E. Indianola Ave., has been incorporated by Frederick C. Appel with a capitalization of \$50,000 to manufacture trailers.

SOUTH CAROLINA

MARION, S. C.—City has approved bond issues of \$115,000 for sanitary and storm sewers.

TEXAS

AMARILLO, TEX.—Bureau of Mines plans construction of helium plant to cost \$146,000.

DALLAS, TEX.—Fruehauf Realty Corp., Mercantile Bank Bldg., has started work on a 1-story factory at 660 Fort Worth Ave. which will cost about \$125,000.

HOUSTON, TEX.—City had awarded a \$133,565 contract to Elder Construction Co., 160 Gregg St., for storm sewers.

MOUNT PLEASANT, TEX.—City has awarded a \$57,625 contract to Reynolds & Huff, Tyler, for improvements to city's sewage sys-

tem. Engineers are Koch & Fowler, Great National Life Bldg., Dallas.

PHARR, TEX.—City has awarded a \$99,000 contract to Fitzgerald, Newton & Carey Inc., 317 S. Main St., McAllen, for a sewage disposal plant. Engineer is Alfred Tamm, 216 E. Van Buren Ave., Harlingen.

ROPESVILLE, TEX.—City has FWA funds for a sewer system to cost \$55,450. Engineers are Isbell Engineers, Box 1005, Brownfield.

SOUTH HOUSTON, TEX.—City plans a sewer system to cost about \$55,000 and a water system to cost approximately \$65,500. Engineer is Frank Metyko, Scanlon Bldg., Houston.

WASHINGTON

SEATTLE—Monsanto Chemical Co. will call bids in May for proposed \$1 million plant on recently acquired 29-acre tract. James Worth is resident engineer.

SEATTLE—Northwest Wire Works Co. plans to build a factory, 40 x 80 ft at 2750 Sixth Ave. S. L. G. Waldron is the architect.

TACOMA, WASH.—City plans \$1,300,000 bond issue to finance water system improvements.

WISCONSIN

FOND DU LAC, WIS.—Electro Plating Co. has been formed by Frank Herrmann to specialize in chromium plating.

CANADA

CHATHAM, ONT.—Hinde & Dauch Paper Co., Sandusky, O., has purchased a 22-acre site here for construction of a \$1 million box factory.

LONDON, ONT.—Kelvinator Co. of Canada Ltd., Duncan St. E., has awarded a contract to Hyatt Bros. Construction Co., 288 Egerton St., for a \$250,000 plant addition. Architect is J. M. Watt, 394 Richmond St.

OTTAWA, ONT.—International Harvester Co. of Canada Ltd., 208 Hoyleard St., Hamilton, is calling for bids through Hazelgrove, Lithwick & Cameron, architects, 53 Queen St., for construction of a \$500,000 plant.

SARNIA, ONT.—Electric Auto Lite Ltd., Christina St. N., is preparing plans and will call for bids for construction of a plant addition to cost about \$50,000.

SCARBOROUGH TOWNSHIP, ONT.—Metal Stampings Ltd., 3600 Danforth Ave., has awarded contract to Bennett Pratt Ltd., 30 Bloor St. W., Toronto, for construction of a \$500,000 rolling mill. Architects are Parrott, Tambling & Witmer, 57 Bloor St. W., Toronto.

STAMFORD TOWNSHIP, ONT.—Canadian Carborundum Co. Ltd., Stanley St., has awarded contract to Carter Construction Co. Ltd., 419 Cherry St., Toronto, for construction of a \$500,000 plant addition. Engineer is C. D. Howe Co. Ltd., 36 James St. S., Hamilton.

WINDSOR, ONT.—Champion Spark Plug of Canada Ltd., 1624 Howard Ave., has awarded a \$65,000 contract to Allan Construction Co., 44 Wyandotte St. E., for a plant addition.

WINDSOR, ONT.—Kelsey Wheel Ltd., 309 Ellis St. E., has awarded a contract to Allan Construction Co., 44 Wyandotte St. E., for a \$70,000 press plant.

FAIRVILLE, N. B.—St. John Sulphite Ltd. has awarded contract to Foundation Maritimes Ltd., 185 Lower Water St., Halifax, for construction of pulp mill here to cost about \$750,000. St. John Dry Dock & Shipbuilding Co. Ltd., Bayside Dr., East St. John, has contract for steel trusses.

NEWCASTLE, N. B.—Fraser Companies Ltd., Edmundston, has awarded contract to E.G.M. Cape & Co., 620 Cathcart St., Montreal, for construction of pulp mill here to cost about \$4 million including the equipment.

OUTREMONT, QUE.—Anglo Canadian Brush Factories Ltd. is receiving bids through Sydney & C. S. Comber, architects, 1502 St. Catharine St. W., Montreal, for construction of a \$85,000 factory.

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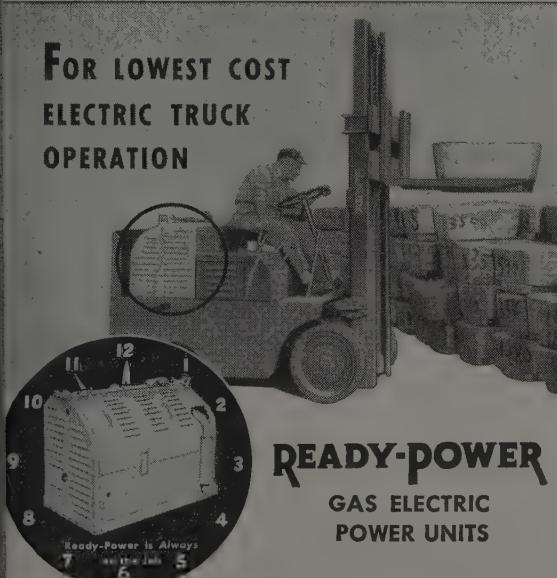
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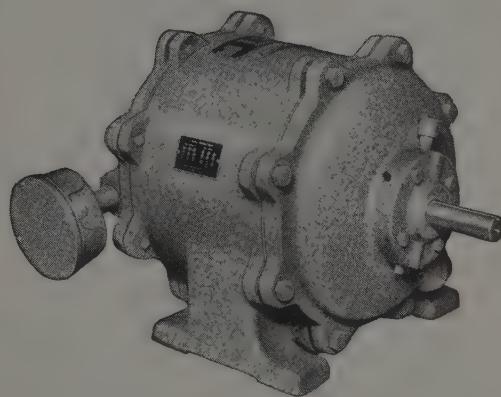
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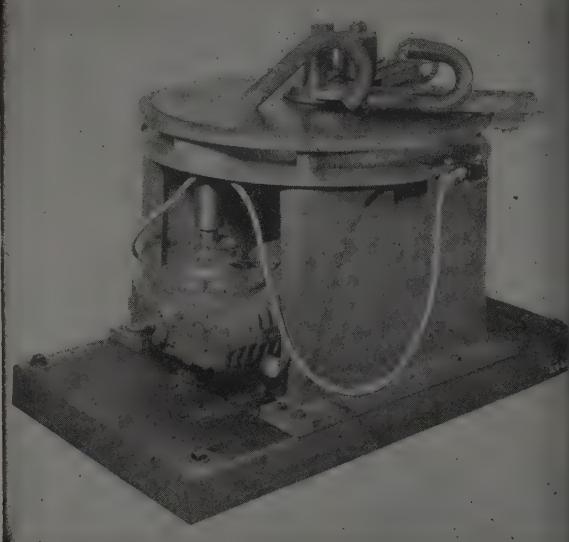


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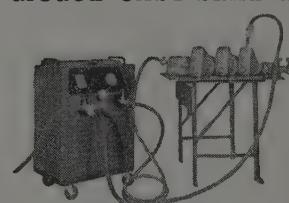
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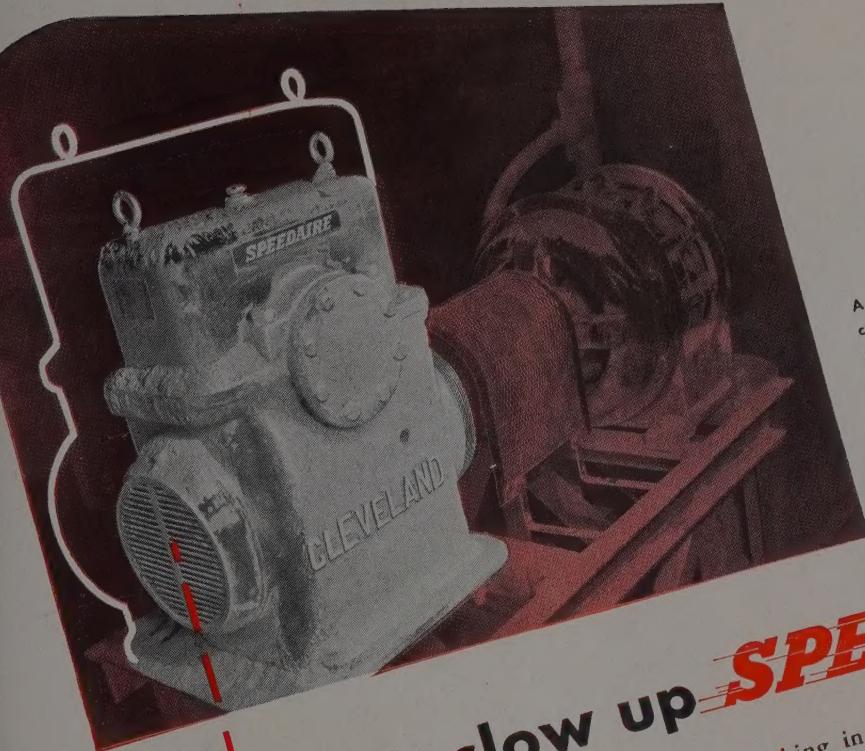
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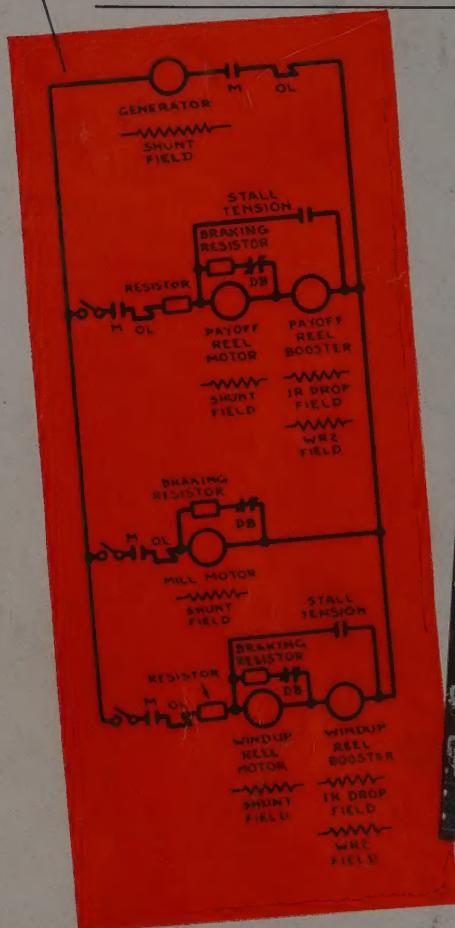


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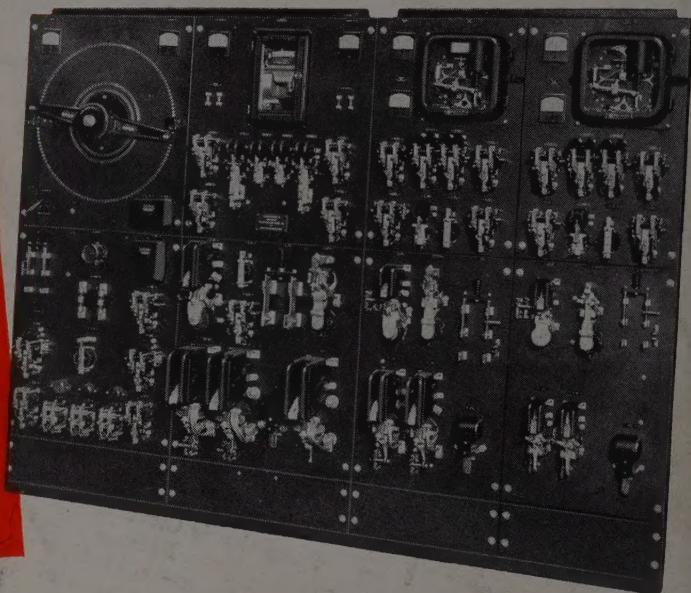
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Cutler-Hammer bulletin 14049 control offers any combination of the following functions:

1. Linear speed changes of process equipment by voltage adjustment on the main generator set.
2. Jogging of all units individually or in any combination, either forward or reverse.

3. Pre-selected running speeds.

4. Manual loop control by means of vernier rheostats; or automatic loop control by means of mechanical or photo-electric limit switches or photo-thyatron control.
5. Constant tension control to compensate for changes in coil diameter on uncoilers and/or re-coilers.

Cutler-Hammer bulletin 14049 D-C Adjustable Voltage Control is built throughout to the famed Cutler-Hammer standards of dependability, ruggedness and simplicity. CUTLER-HAMMER, Inc., 1211 St. Paul Avenue, Milwaukee 1, Wisconsin. Associate: Canadian Cutler-Hammer, Ltd., Toronto, Ont.

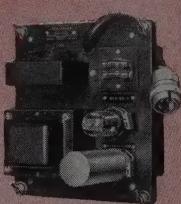
TYPICAL COMPONENTS OF CUTLER-HAMMER MILL CONTROL



Cutler-Hammer control desk. Sloping top for easy visibility. Front slanted for toe room.



Synchronous motor starter for motor generator set.



Quick-change unit control panel for photo-electric limit switch.

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